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International Library of Technology

A SERIES OF TEXTBOOKS FOR PERSONS ENGAGED IN ENGINEERING PROFESSIONS, TRADES, AND VOCATIONAL OCCUPATIONS OR FOR THOSE WHO DESIRE INFORMATION CONCERNING THEM. FULLY ILLUSTRATED

DESIGN MOTIFS
DESIGN COMPOSITION
SPACE FILLING
COLOR IN DESIGN
HISTORIC STYLES

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PREFACE

The volumes of the International Library of Technology are made up of Instruction Papers, or Sections, comprising the various courses of instruction for students of the International Correspondence Schools. The original manuscripts are prepared by persons thoroughly qualified both technically and by experience to write with authority, and in many cases they are regularly employed elsewhere in practical work as experts. The manuscripts are then carefully edited to make them suitable for correspondence instruction. The Instruction Papers are written clearly and in the simplest language possible, so as to make them readily understood by all students. Necessary technical expressions are clearly explained when introduced.

The great majority of our students wish to prepare themselves for advancement in their vocations or to qualify for more congenial occupations. Usually they are employed and able to devote only a few hours a day to study. Therefore every effort must be made to give them practical and accurate information in clear and concise form and to make this information include all of the essentials but none of the non-essentials. To make the text clear, illustrations are used freely. These illustrations are especially made by our own Illustrating Department in order to adapt them fully to the requirements of the text.

In the table of contents that immediately follows are given the titles of the Sections included in this volume, and under each title are listed the main topics discussed. At the end of the volume will be found a complete index, so that any subject treated can be quickly found.

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DESIGN MOTIFS

PURPOSE

1. Distinction Between Drawing and Designing. The purpose of this Section is to serve as an introduction to the work of decorative designing. The training so far given has been entirely a training in drawing, which is the necessary foundation for designing, because it is only by means of drawing that the artist's ideas for designs can be expressed in visible form.

The making of a design consists of two separate operations; one, the originating and planning of the design in the mind, and the other, the expressing of this design graphically on paper. Inasmuch as drawing is the only method by which the design can be graphically expressed, it is evident that instruction in drawing must precede instruction in designing, which is the method pursued in this Course.

2. First Stage in Learning to Design.—Just as the builder must have certain materials with which to build a house, and the writer certain definite characters and situations with which to construct a story, so the designer must have certain elements, or units, which he may combine to make a design. A successful design consists of well-arranged forms or units, each having an individuality of its own, just as a mosaic pavement or floor consists of well-arranged tile forms of various shapes and colors, which tile forms themselves have individuality and are of various forms.

3. Motifs.—In the field of decorative designing the term **motif** is applied to the individual units or parts that, properly

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combined and grouped, go to make up the entire design composition. The designer, therefore, first of all must become familiar with these various classes of design motifs and the methods by which they are devised before he can compose or evolve therefrom designs for definite spaces and particular purposes. This is the first stage in learning to design.

4. Classes of Design Motifs.—The two main classes of design motifs with which the beginner in design work is concerned are *arbitrary motifs* and *plant-form motifs.*

5. Arbitrary motifs include the simplest kinds of dots, round or square; lines, straight or curved; and geometrical figures, solid or in outline, such as circles, squares, diamond shapes, triangles, etc. In fact, from the simplicity and arbitrary character of these design units, they could be termed *geometrical motifs.*

6. Plant-form motifs include all design units or forms that are taken bodily from, or are based on, natural forms, such as plants, flowers, leaves, stems, blossoms, etc.—in fact, all growing things in nature that may be included under the general term plant forms.

7. These two classifications cover all the forms which concern the beginner. The experienced designer, in practicing his profession in certain commercial lines of decorative design, may appropriate details from various sources, as from the human being, or from the animal kingdom, but such a procedure is adaptation and not designing.

8. Distinction Between Design Motifs and Ornament. The student must not confuse these design motifs, or units, with what is sometimes termed ornament. **Ornament** is something that is added to or placed upon some object to beautify or to enrich it, such as carved or inlaid work on an article of furniture; or earrings, finger rings, or other jewelry adorning a woman. Sometimes the term ornament is applied to those decorative forms that have come down to us from ancient races or peoples; but these forms should properly be called **historic**

styles of decoration. The idea that the free adaptation and arrangement of these historic styles of decoration is designing is an erroneous one. Designing consists of composing, evolving, or building up decorative surfaces or objects, using design motifs as the units with which to construct the design.

ARBITRARY MOTIFS

9. Arbitrary Motifs the First Source of Designs.—The student of design naturally starts with the elementary arbitrary forms, because with such forms designers in every nation and every period have begun. The early specimens of design work done by certain uncivilized and semicivilized races, although these peoples could not possibly have come in contact with one another, show many points of similarity. The same sensations and standards of pleasing line, proportion, and color come to people of the same degree of civilization; for people, the world over, and in all times, are of the same human family, and the outward expressions of their emotions and tastes are the same.

10. The early designer began with arbitrary forms, usually geometrical, because with these forms he was most familiar, or because they added to the apparent structural strength of the article decorated. For example, the primitive warrior, when carving his paddles, hunting paraphernalia, cooking utensils, etc., imitated with knife cuts the geometrical forms that he saw on the rude woven and stamped cloths about him. The Greek fret, or key, design originated from the custom of laying bricks on edge, so as to form such a fret pattern. Also, the savage races first, and the civilized nations later, decorated implements and utensils with dots, spots, lines, and geometrical shapes so as to apparently strengthen the weak portions.

11. Forms of Arbitrary Design Motifs.—The beginner, therefore, when evolving designs, must not employ elaborate details copied bodily from natural floral or leaf forms or from existing decorative work prepared by other designers, but for his earliest attempts should employ simple dots, lines, and geometrical figures.

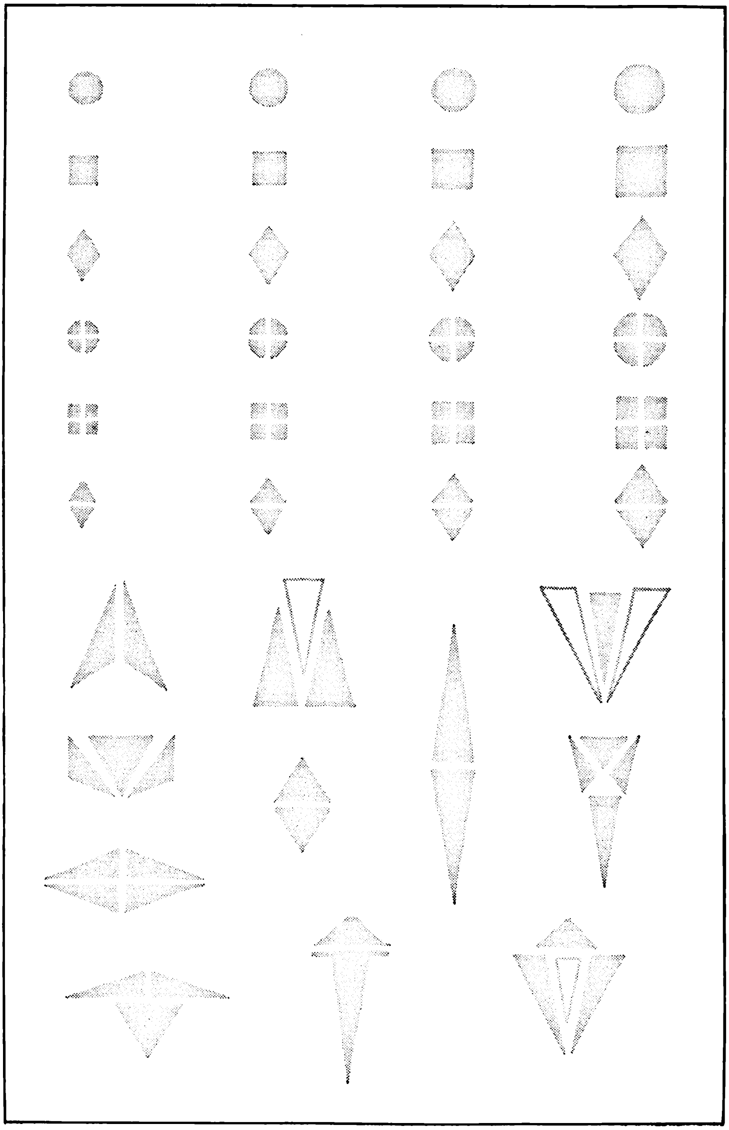

FIG. 1

12. In Fig. 1 are shown some of these simple forms. At the top are round dots of various sizes, which could be made with the end of a soft lead pencil or with a brush. Below these are simple square dots, and, below these, diamond shapes. Next are shown variations of these round, square, and diamond-shaped spots, made by subdividing them by white lines. Below these, as a further example of the numerous possible variations of a single form, certain combinations of triangles are shown. Similar alterations and combinations can be devised with the circle and the square. These forms need no illustration, for the student will have no difficulty in devising them along the lines shown for the triangles in Fig. 1.

13. Sources of Arbitrary Motifs.—Other arbitrary motifs besides those already described—dots, triangles, circles, squares, etc., to which may be added straight lines—can be found by simply using one's powers of observation. Door knobs, hinges, electric-light bulbs and shades, telephone or telegraph-wire insulators, spigots, kitchen utensils, tableware, inkstands, etc., all have their individual formations, which, if treated in silhouette as spots, will serve as interesting arbitrary design motifs. The student should carry a notebook and jot down such arbitrary forms as memoranda sketches, to be used afterward as design motifs. Further, the type forms of Arabic numerals, 1, 2, 3, 4, 5, etc., and of the letters of the alphabet, A, B, C, D, E, etc., can be used to form interesting units. Each numeral or letter can be used in pairs; as two 3's, or two B's, one being in its normal position and the other in reversed position, and thus placed back to back. If the numerals or letters are drawn rather heavy, and in a rustic style, when so combined there will be little suggestion of the original numeral or letter, and very interesting spot motifs or units will be formed.

14. Geometrically Developed Motifs.—Very interesting arbitrary motifs can be devised by the designer who has skill with the **T** square, triangle, and compass, by developing geometrical figures within other figures. Thus, the circumference of a circle may be spaced off into five, six, seven, or more points, these points then being connected by lines following the circle's circumference, and also by cross lines. The resulting star-shaped devices may again be subdivided, and then connected by lines, thus forming other interesting arbitrary forms. This process may be employed with not only the regular and the irregular geometrical *plane figures*, but also regular and irregular geometrical *solids* projected in perspective. Myriads of forms for arbitrary motifs may thus be produced.

While a training in geometry is not absolutely necessary for the designer to be able to develop geometrically such arbitrary forms, yet it would be of advantage to the designer to be provided with a book on geometry.

Only the motifs or units themselves, as isolated details, are now being considered. The combining of these motifs, for the purpose of building up designs—that is, for design composition—will be discussed in another Section.

PLANT-FORM MOTIFS

15. Motifs From Nature the Units of the Best Designs.—While in ancient times men may have been content to scratch on stone or wood designs composed of rude, arbitrary motifs, yet history shows that very soon greater ability for the expression of useful and decorative design was developed and mere arbitrary forms were found insufficient. Natural forms, being observed constantly, were therefore used as the basis of this developing design; and modern designers must likewise look to nature to secure fresh and unhackneyed suggestions for their designs. If it were not for the influences of nature in natural forms, man's imagination would be incapable of producing the grace, the growth, the flow of line and delicacy that delight the beholder of a satisfactorily executed design. These influences are usually undetected and so indirect that most persons do not feel them at all.

16. Plant-Form Motifs Should Be Evolved, Not Copied.—A designer should have clearly before his mind the general characteristics of the motifs or units on which he is to base his design, and should be able to work intelligently from this point to the completion of his design. Therefore, he must have studied the designs of others and must be able to analyze them for their good points, or to criticize their poor points. Such designs, if convenient for reference, may be of assistance to him; but under no circumstances should he copy the idea or the details of another design, as such action makes him simply a machine and an imitator, and tends to destroy his own originality and to make him dependent on the originality of others.

While many designers depend entirely for their motifs on the efforts of others, successful designers are independent of such methods and take their inspiration directly from nature. The carpet designer often appropriates the work of the wall-paper designer without considering the fitness of the pattern to its application or purpose. On the other hand, the average wallpaper designer tends to make his designs simply variations of the designs of others, instead of inventing them himself. The action in both cases usually results in weak and inappropriate designs. Many recent publications contain plant studies and other floral forms that furnish motifs of which designs may be built; but, though excellent in themselves, these motifs are public property and are sought and seized by so many designers that they soon become commonplace and are applied to all sorts of things.

The factories apply the designs of others, and no designer should waste his time copying designs already manufactured, except where such copying may be necessary to learn the technique. The great fountain head for inspiration is nature, and, with all her forms, she furnishes an inexhaustible supply of material that can be suited to any purposes of design.

NATURE STUDY

17. Nature Study Contrasted With Botany.—The very first step in nature study for design work is to analyze plant and floral forms, so as to study them, not only in their entirety, but also part by part. Study of this kind, being concerned simply with the appearances and general aspects of the plant and its various parts, so far as they can be used for design motifs, must not be confused with botanical analysis. The functions of those parts and their physiological relations are not under consideration, as in botany. But the character of the stems, their manner of branching, the attachment of the leaves and the blossoms, and the general appearance of the roots must all be considered in studying plant forms for design work.

The essential difference in the appearance of a maple and a poplar tree may be recognized at once from their unlikeness in growth. Closer inspection shows a difference in the form and color of the leaves, in the manner in which the leaves branch from the stems, etc.; but it is not these minor differences that make it possible to determine, at a glance, the difference between two kinds of trees. In the smaller growths, however, such as shrubs, vines, and single flowers, it is difficult to recognize at a glance one plant from another, unless it be in blossom or unless its characteristic feature be very evident. The student, however, must give attention to these characteristic features and intelligently apply them in his decorative designs without violating any natural law, but simply applying natural laws to decorative purposes. A series of drawings, called studies, should be made of flowers and of leaves, not only singly, but in clusters. Positions of various parts should be changed, care being exercised to so arrange them that the views will bring into prominence the most characteristic details of each plant.

18. Analytic Study of Plants.—In making analytic studies of flowers, the blossom should be first drawn as it appears in nature, accompanied by two or more leaves. It should then be pulled apart and each petal drawn separately. The removal of the petals may leave naked the calyx and pistils, which also should be studied. The part remaining after all the petals have fallen from natural causes is frequently as interesting as the entire blossom. Here is the matured seed vessel from which the infant plant will eventually spring; therefore, here is the material for a new series of studies, and endless changes may be expressed, from the sprouting of the seed to the matured flower or plant. The minute characteristics thus revealed by plant analysis, in their application to design, may form the theme of the entire design more prominently than the outward characteristics of the flower itself. A growing plant is full of interest; and a growing design is likewise full of interest. Thus the subject on which a design is based can be delicate or strong.

The designer must be so familiar with various types of plants that he can draw them from memory or construct them in detail from scanty and hurriedly made notes.

MEDIUMS FOR PLANT STUDIES

CLASSIFICATION OF MEDIUMS

19. Meaning of the Term Medium.—A **medium,** in design work, means a specific kind of pencil or paint that is used in making a plant study or in drawing or painting a design. It is the means by which the study or the design is expressed on paper. While in pictorial work there is a great variety of mediums, there will be considered here, for the plant study and design work, only *lead pencil* and *black-and-white washes.* Color mediums will be discussed in a later Section.

MAKING STUDIES IN LEAD PENCIL

20. Materials Needed.—The **lead pencil** is the simplest of all mediums, because it is always convenient and needs no cumbersome appurtenances to make it serviceable. For ordinary studies and designs, two grades of pencils should be used—one medium soft, as a B or a 2B, and one hard, as an H or a 2H. The pencil should be sharpened so that about $\frac{1}{2}$ inch of the cut wood shows, the lead extending only $\frac{1}{8}$ or $\frac{1}{4}$ inch beyond the wood. A soft pencil requires a sharp knife and great care in sharpening; and very little of the lead, which is quite brittle, should be allowed to extend from the wood. The pencil should be rubbed on a piece of scrap paper until a broad, distinct, yet transparent, line may be produced with it. The grain of the paper should show in places in this broad line.

21. Any paper, except one with a glossy surface or an extremely coarse surface, may be used. Bristol board is too smooth, and water-color paper is too rough. Cold-pressed white drawing paper, which has a fine *tooth*, will give good results. In making studies of plant forms out of doors, or in conservatories or greenhouses, it will be found convenient to use a sketch book or sketch pad, consisting of small sheets of drawing paper bound in book form, or mounted as a pad on a block of heavy cardboard, which may be easily slipped into the pocket when not in use.

22. An eraser should be used as little as possible, for it destroys the surface of the paper. However, it is well to have two in case of emergency—one a fairly firm velvet rubber, and the other a soft, pliable, sponge rubber.

23. Handling the Lead Pencil.—The training in the handling of the lead pencil that has been given in the foregoing Sections should be carefully reviewed, particularly the material on accented-line drawings, for such a method will be used, in some degree, in making plant-form studies in pencil.

The student should become accustomed to a broad method of working; that is, he need not attempt to draw all detail with a hard, sharp pencil, when such detail is not required; and when only the contour of tree forms, plant forms, or leaf forms is to be used in design, the sketch need show no minute details. In such case, therefore, the proper method is to use broad lines or strokes made with the point or edge of a soft pencil. These strokes should be long, sweeping, partly curved, and parallel. For blocking-in, particularly if the paper is at all rough, the harder pencil should be used, because blocking-in lines drawn with a very soft pencil may become blurred and require much erasing.

24. It is good practice, preliminary to drawing from nature, to make careful renderings from clear photographs. Flower studies also make interesting renderings. If a sketch book or

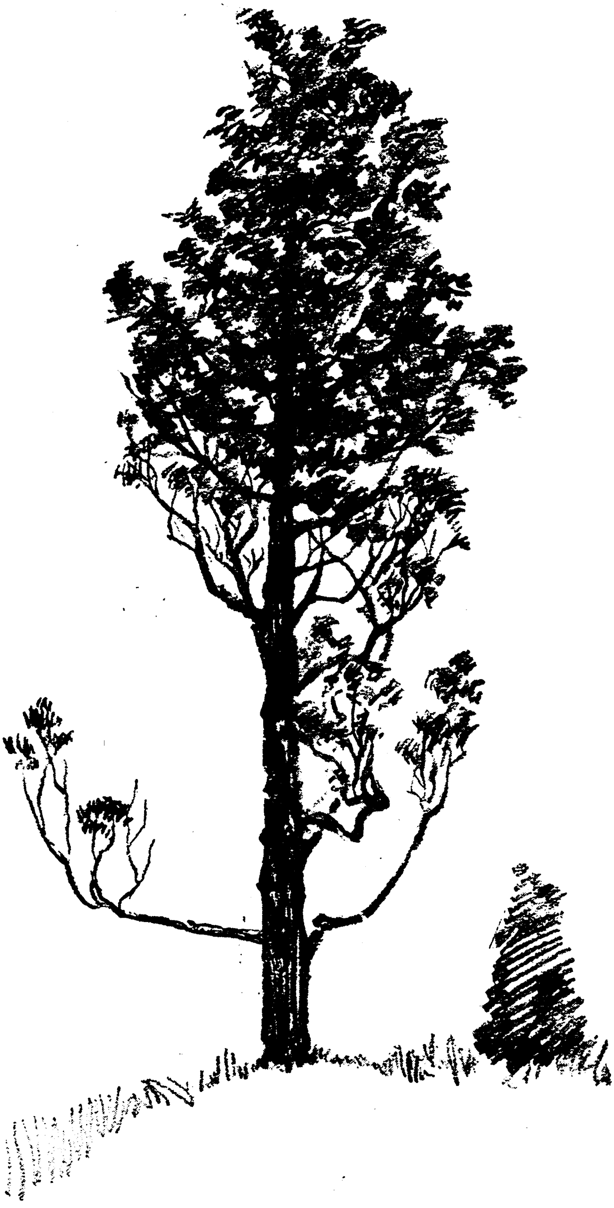

FIG. 2

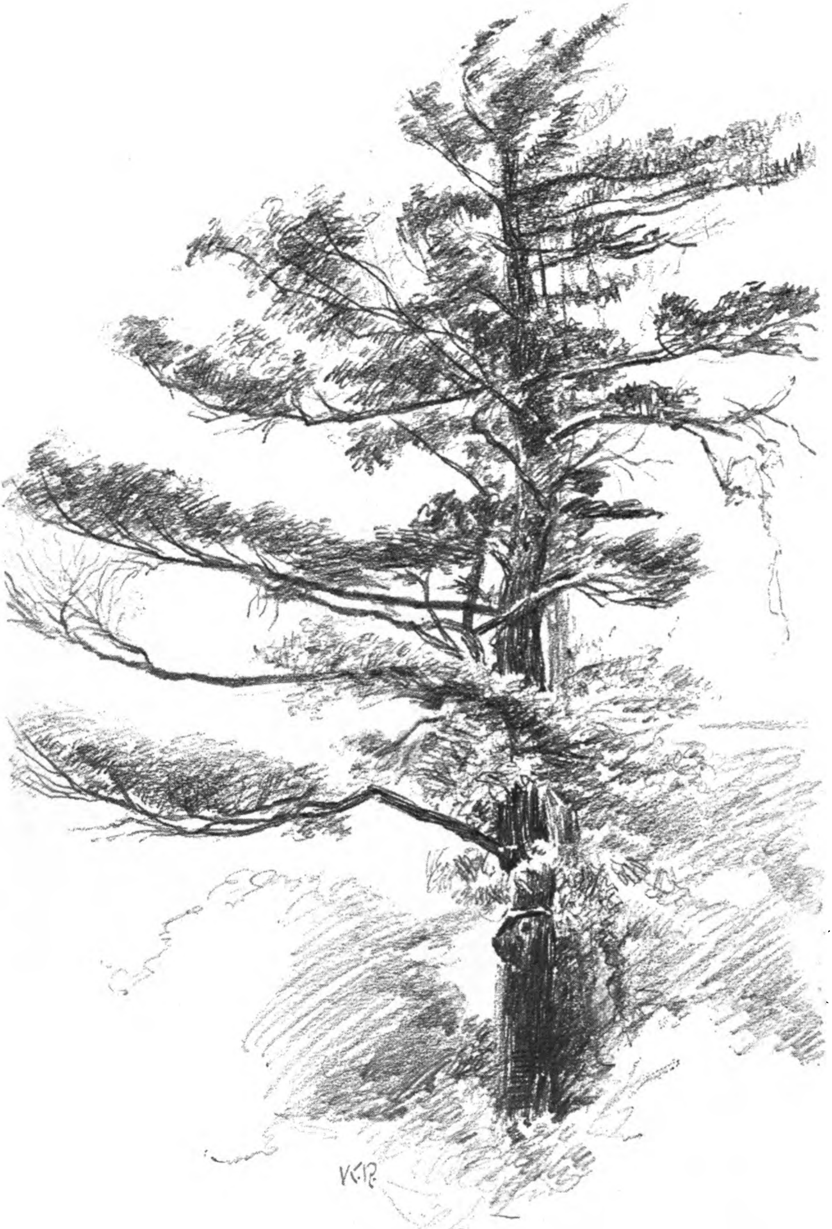

Fig. 3

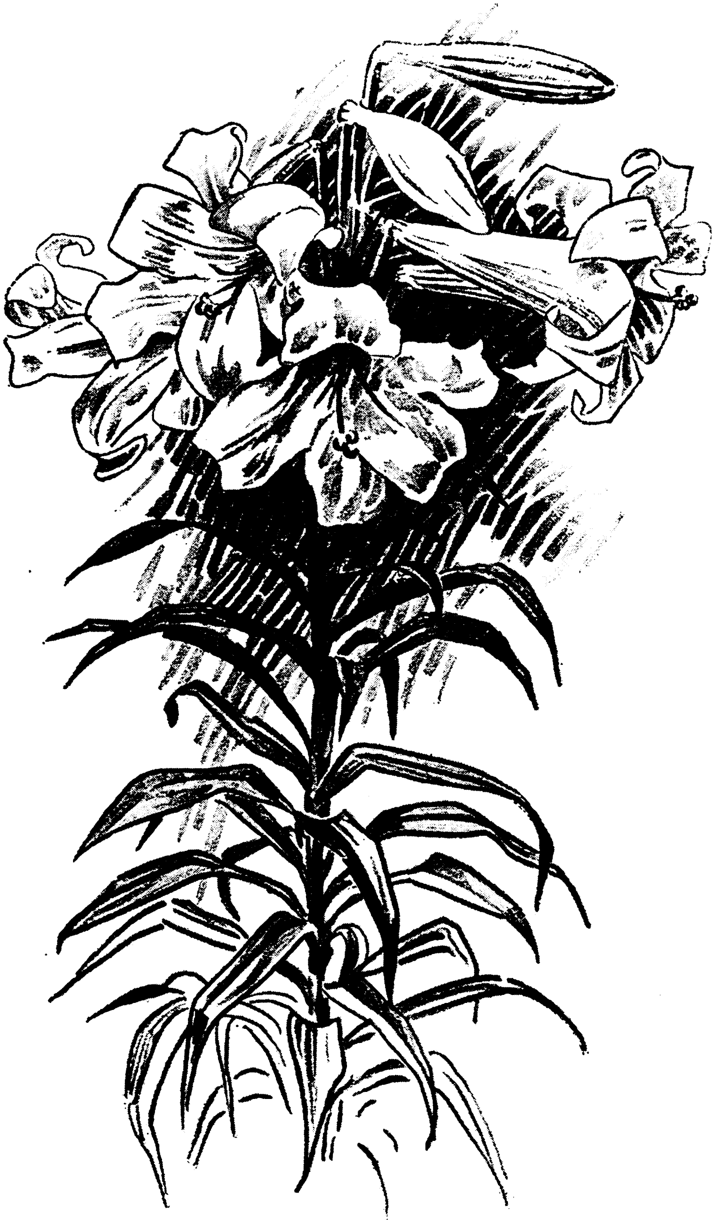

FIG. 4

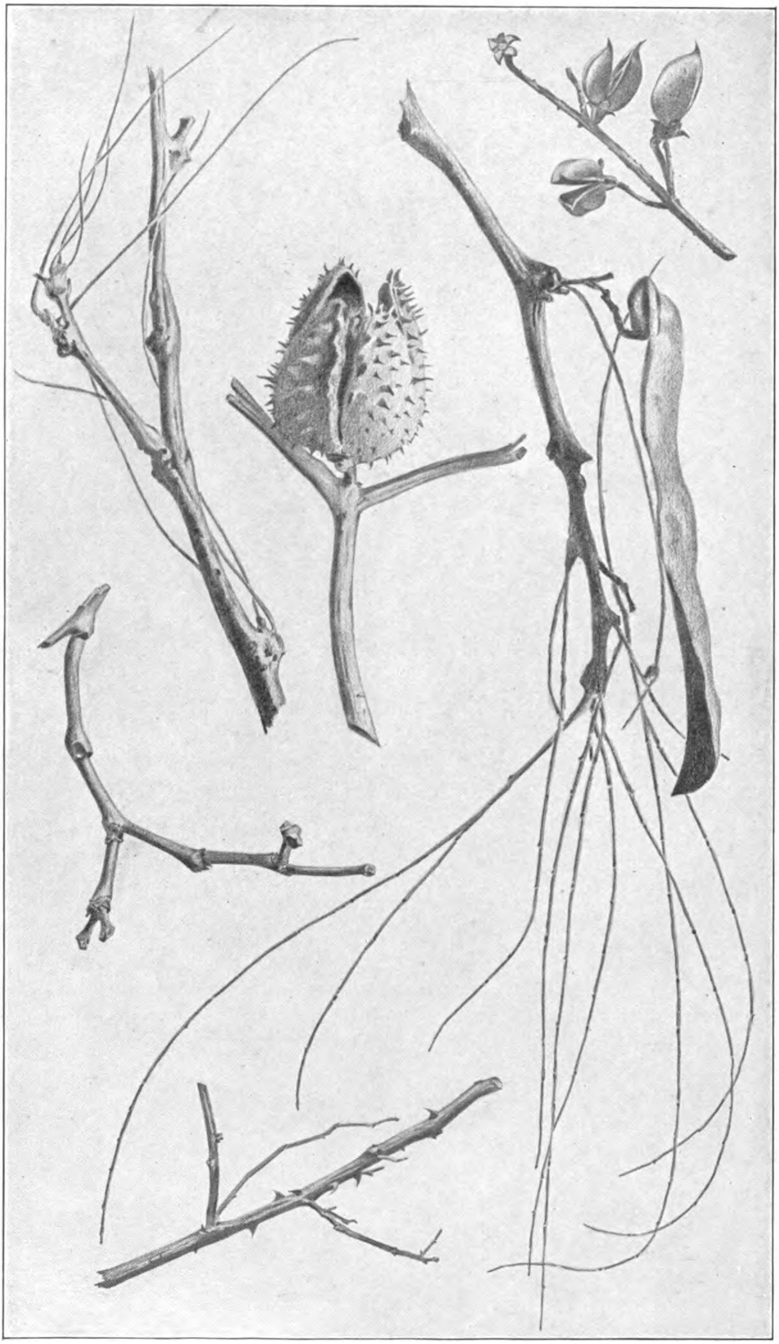

FIG. 5

sketch pad is not used, all necessary sketching materials may be put in an envelope, about 9 by 12 inches in size, and a piece of stiff cardboard, to be used as a substitute for a drawing board, should be included.

25. Renderings of trees are excellent things to start with, to "get one's hand in," preliminary to making plant studies. In Fig. 2 is shown a rendering of a pine tree in which considerable detail is represented, and also gradations of tone with light lines. The illustration shows clearly how the lead-pencil lines were drawn to get the various effects. In the tree shown in Fig. 3 much more contrast is evident, and this evergreen is portrayed almost entirely by very dark pencil strokes. It should be observed that, even when dark values are shown, the pencil strokes are individual. In all parts the lines are clear cut, the shadows being put in with a soft pencil, giving blacker strokes, while for the half tones a harder pencil is used.

26. Broad Treatment and Detailed Treatment Compared.—After such preliminary practice the student is ready to make studies more in detail from the smaller plant or flower forms. The illustrations of the broad free method of pencil rendering shown in Fig. 4, and of the finely detailed method shown in Fig. 5, are introduced for the purpose of showing the student the characteristics of these contrasting methods. He may use in his detailed plant studies either the broad rendering, as in Fig. 4, or the more detailed rendering, as in Fig. 5, in which almost photographic exactness and fidelity to detail are necessary because of the minuteness of the stems and buds and their details.

MAKING STUDIES IN WASH

27. Wash Drawings.—Wash drawings are those that are made with a brush and a mixture of soluble India ink or water-color pigment, and water. There is really no abrupt transition from the method of handling the lead pencil to that of handling the brush in applying washes or in doing brush work. The Japanese for centuries have used the brush as a pencil or pen; and modern art workers in both decorative and pictorial work are using the brush to make drawings in lines, as well as those made in mass and termed wash drawings. When the tone values in a rendering are represented in broad, solid masses, made of individual brush strokes or lines run together while wet, the process is known as **wash drawing,** and these flat masses of gray, black, or colors, are called *washes*. Wash drawing, in its technical sense, however, refers only to renderings executed in tones of gray; that is, in black and its gradations.

28. Materials Needed.—Washes are made by mixing a few drops of water with a little black non-waterproof ink, or with some black water-color pigment, such as charcoal gray or ivory black. Perhaps the smoothest washes are those made with charcoal gray diluted with water. Suitable brushes are a medium-size Japanese brush, and a red sable water-color brush No. 6.

Whatman's cold-pressed drawing paper, sometimes called water-color paper, with a fairly rough-toothed, but not too rough, surface is the best for this purpose, and must be properly mounted or stretched on the drawing board before being used. Illustrators' board, which is a heavy cardboard with water-color paper mounted on one side, is excellent for this purpose, because no mounting or stretching is required, but it is rather expensive for practice work. The sketch book or sketch pad is used without stretching or mounting the paper.

Other useful materials, that can be secured at home or purchased at little cost, are as follows: Drawing pencils for sketching in the work, and a sharp knife to keep the pencils well pointed; water glasses, one for clean water and one for water in which to rinse the brushes; sponges of fine texture, for washing out at any place necessary, and for general cleaning of dishes, paint box, etc.; large white blotters for drying the brush when the surplus pool of wash is taken up, and for other uses; and clean, white absorbent rags or old cloths for drying and cleaning brushes, etc.

29. Preparing the Wash.—Place a little water—several teaspoonfuls will do—in a china dish or saucer; put a drop or two of water on top of the half pan of charcoal-gray pigment, so that it may soften the pigment and enable the brush to take up some of it; moisten the brush slightly, dip it in the soaked-up charcoal-gray pigment, then into the clean water of the saucer, stir it around, and the black pigment will dissolve in the water, making a beautiful silvery gray. If tube pigment is being used, squeeze out about $\frac{1}{4}$ inch of the pigment on to the edge of the saucer, take it up with the brush, and stir it around in the water as before. If non-waterproof ink, that is, soluble drawing ink, or India ink, is being used, several drops of the pure black ink from the bottle may be placed with the clear water in the dish, and stirred as before.

30. Methods of Holding Brushes.—In drawing lines with a pencil there are limits to the weight, strength, and firmness that can be expressed; but with the brush there are no such limitations. By using brushes of various sizes, and different shades of pigment, there is no degree of boldness and power of expression that may not be reached in any design, whether it is composed of individual lines or of shaded surfaces. In drawing lines with a brush, called **brush-stroke work,** there are many kinds of brushes that will produce the required

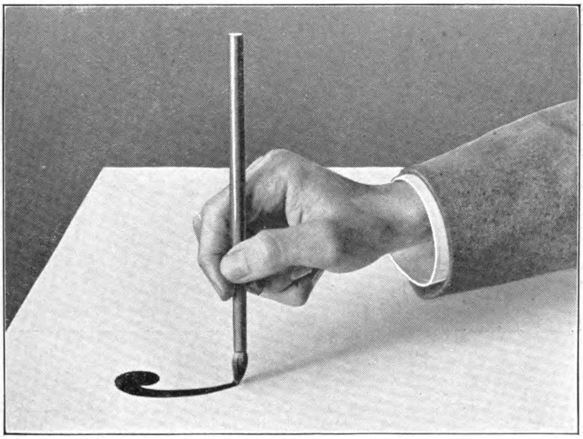

FIG. 6

results; but the Japanese painting brush is undoubtedly the simplest, after the student has become accustomed to its management.

31. In Fig. 6 is shown the method of holding and using the Japanese brush. The brush is held, not as is an ordinary water-color paint brush, but as shown in the illustration, in order that there may be perfect freedom of movement to the hand, and power to produce even results in all directions. The details for the correct use of the Japanese brush will be discussed more fully in the directions for brush-stroke practice that will follow.

32. In Fig. 7 is shown the method of holding the regular water-color brush, such as a red sable brush. This brush, as will be observed, is held more as the pencil and pen are held in writing, because effects are secured with the edge of the brush as well as with the point.

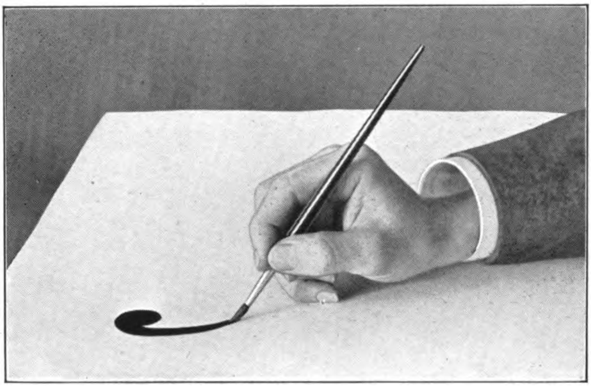

FIG. 7

33. **Practice in Brush-Stroke Work.**—As a preliminary preparation for making plant studies with brush and wash, the manipulation of the brush must be learned by practice work in brush strokes.

The method of preparing the wash has already been described. Whether or not the wash is dark or light enough for the purpose intended may be determined, after stirring the brush in it thoroughly, by drawing the brush across a piece of paper and allowing the stroke of wash to dry. If the result is too light, more pigment should be added to the wash; if too dark, more water is needed.

In beginning brush-stroke practice, hold the Japanese brush as illustrated in Fig. 6, dip it in the wash mixed in the china dish or tray, and hold it perpendicularly over the paper. Draw a vertical straight line, with a single movement or sweep of the arm, keeping the hand free from the paper, or if necessary steadying the hand by resting the little finger on the paper, and exerting an even pressure on the point of the brush. Do not permit the brush to become inclined in any direction, and do not allow any movement of the fingers to change the form or direction of the line, both of which should be controlled entirely by the movement of the arm. Draw this vertical stroke slowly and continuously, and never allow the movement of the hand and brush to become jerky. Confine the entire attention to the execution of a single line, and pay no heed to any wavering or apparent irregularity, for these are of no importance. The main purpose is to secure a brush-stroke line of uniform width by keeping a uniform pressure on the brush throughout the entire length of the stroke.

34. In Fig. 8 are shown some examples of faulty brush-stroke practice, which are introduced to show how the strokes should *not* be made. The two brush strokes in (*a*) are faulty because they are due to a gradual increase or decrease of pressure as the stroke progresses. At (*b*) is a line of unequal thickness, due to varying pressures throughout the stroke. Such a line as that at (*c*) is not entirely objectionable, although it is not perfectly straight. A ruled line like (*d*), however,

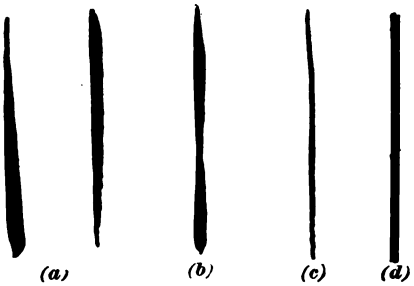

FIG. 8

would not do for the present purpose of plant-form sketches, although ruled brush lines, made by steadying the hand with a straightedge, are occasionally used in commercial art work.

FIG. 9

35. The proper kinds of varied brush strokes, illustrated in Figs. 9, 10, and 11, should be practiced after the student has acquired proficiency in drawing lines with the brush; that is, brush strokes of uniform width. Strokes such as shown in Fig. 9 may serve as expressions of conventional forms, as of a leaf, or the petal of a flower, for example, by single strokes of the brush. To make a stroke such as shown in Fig. 9, the brush is thoroughly charged with the wash, the point then laid lightly on the paper, and the brush drawn toward the student with an even, straight stroke, the pressure being gradually increased until at the center of the stroke the full width of the brush is utilized. Then the pressure on the brush is gradually decreased until the end of the stroke terminates in the point of the brush, thus producing a leaflike form, as shown in Fig. 9. It is readily seen how typical of an actual leaf form is such a conventional stroke, and therefore how brush-stroke practice work prepares for, and assists in, the making of plant studies. Repeated practice on such strokes as that of Fig. 9, making the forms vertical, horizontal, and inclined, will be found beneficial.

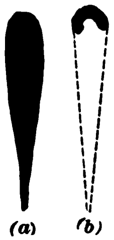

FIG. 10

36. Another form of brush stroke is shown in Fig. 10 (*a*), where the upper end is round instead of pointed, and the point of greatest breadth is nearer the upper end than the middle of the stroke. This stroke is regulated by brush pressure entirely; but in starting it the point of the brush should be used to draw a short curve, such as shown in Fig. 10 (*b*), and while this curved stroke is still wet the end of the brush is pressed down beneath it until the hairs spread sufficiently to include it in the general stroke that follows. This form of stroke may also be drawn in the same manner as that shown in

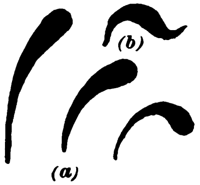

FIG. 11

Fig. 9, the stroke being carried only half way, and the lower end being finished with a small curve. This will produce a form like that in Fig. 10, but upside down. Having drawn with a brush these two forms repeatedly, until they can be produced so uniformly that several of them side by side appear to be almost exactly alike, the student may attempt to draw the same figures curved instead of straight, like the single and compound curves shown in Fig. 11 (*a*) and (*b*).

37. Practice in Laying Flat Washes.—While most of the plant studies prepared in wash will be in the form of brush strokes, yet some practice in laying washes will be to the student's advantage.

Plenty of wash should be placed on the No. 6 red sable water-color brush, and the start may be made at the upper edge, or other convenient point, of the space to be covered, this edge or margin being filled with a liberal supply of wash, which is then spread evenly and generously over the entire surface. The wash can be carried to any extent by recharging the brush from time to time and adding wash to the surface that is not yet dry, or to the bottom of the pool of wash previously applied. Should the wash become dry, or nearly so, it will be impossible to apply a new tint over it of greater extent without showing a line where the first wash stopped.

38. To lay such flat washes in a given space, as is shown in Fig. 12, take up as much of the wash as the brush will hold and first apply it to the upper edge of the rectangle. Have enough wash to keep a liberal pool at the top of the rectangle. Tilt the board so that, with the aid of the brush, the wash may be led to flow downwards toward the lower edge of the space to be covered, using a series of strokes, as shown in Fig. 12. As each stroke is made, dip the brush in the wash and, by means of successive horizontal brush strokes with a liberal supply of fluid on their lower edges, carry the wash down over the rectangle.

If the brush cannot contain sufficient wash to carry the entire pool across from side to side, carry it as far as possible, and redip the brush in the wash in the saucer. Under no circumstances must the lower edge of this wash be allowed to become even partially dry as it proceeds across and down over the rectangle, for, if it does, a hard and sharp line will be left.

When the lower edge of the rectangle is reached, the surplus wash may be taken up with a dry brush, or with one from which the wash has been extracted by drawing it across a blotter. Repeated applications of the brush to the blotter and to the lower edge of the rectangle will remove all the surplus fluid and leave the entire wash perfectly even and clean. Such practice exercises in laying flat washes should be tried repeatedly.

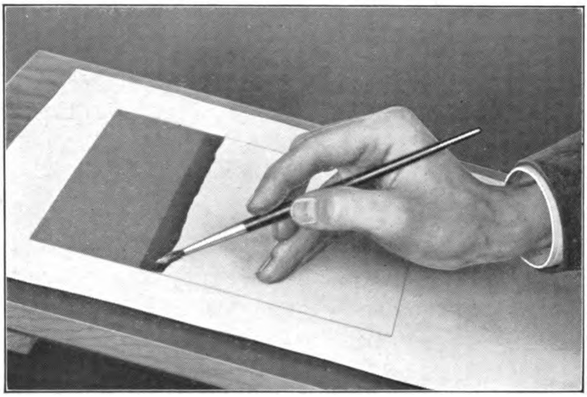

Fig. 12

39. Practice in Laying Graded Washes.—To make plant studies in wash, the student does not require an extended training in the use and application of graded washes. It may be said briefly, therefore, that graded washes are laid by first applying the uppermost value on the top edge of the space to be covered, using a brush charged with very dark color. This wash is carried down about one-fourth the depth of the space from the edge from which the work began. The pool at the bottom of this wash remains as usual while the tip of the brush is redipped in clear water and added to the lower edge of this pool, so as to dilute it, and the wash is then carried somewhat farther down. Again the brush is dipped in water, and the diluted wash is carried still farther down until the bottom of the space is reached, and the tone is almost that of clear water. In this way the wash grades from dark to light. Considerable practice is necessary before such blendings can be done smoothly and satisfactorily.

ANALYZING AND SKETCHING PLANT FORMS

40. Method of Analyzing and Sketching.—While naturalistic studies of every important flower and plant may be obtained from art stores or from picture dealers, these will not always serve as satisfactory design motifs, and, therefore, the student should make his plant studies direct from the living plant, obtaining actual specimens from the fields, gardens, or conservatories. First, with the specimen before him, and while the plant or flower is fresh, studies should be made of it entire, from several viewpoints. Then the flowers, leaves, etc. should be plucked apart, and studies made from these separate parts.

Fig. 5 shows such a series of studies in pencil; Figs. 13 and 14, such a series in black and white wash; and Fig. 15, a series in monotone color washes outlined with a stronger color. The student, however, is not required to make any color studies at this stage of his course.

The method of making pencil studies like those in Fig. 5 needs no special description. Studies of stems, both soft and woody, should be made by themselves. Tendrils and seed cupules of various kinds should also be studied. These forms are apt to be overlooked, or when introduced into a design may be badly expressed, because the designer has not given them proper attention. Practical work of this kind will fix in the mind the important relation that these forms bear to the character of the whole plant, and studies of this character should be frequently made and preserved for future reference.

41. In Fig. 13 is shown an analysis of the common dandelion, the studies of the entire plant and those of individual parts being made in wash, as previously described. This simple little flower is rich in suggestion, and the various

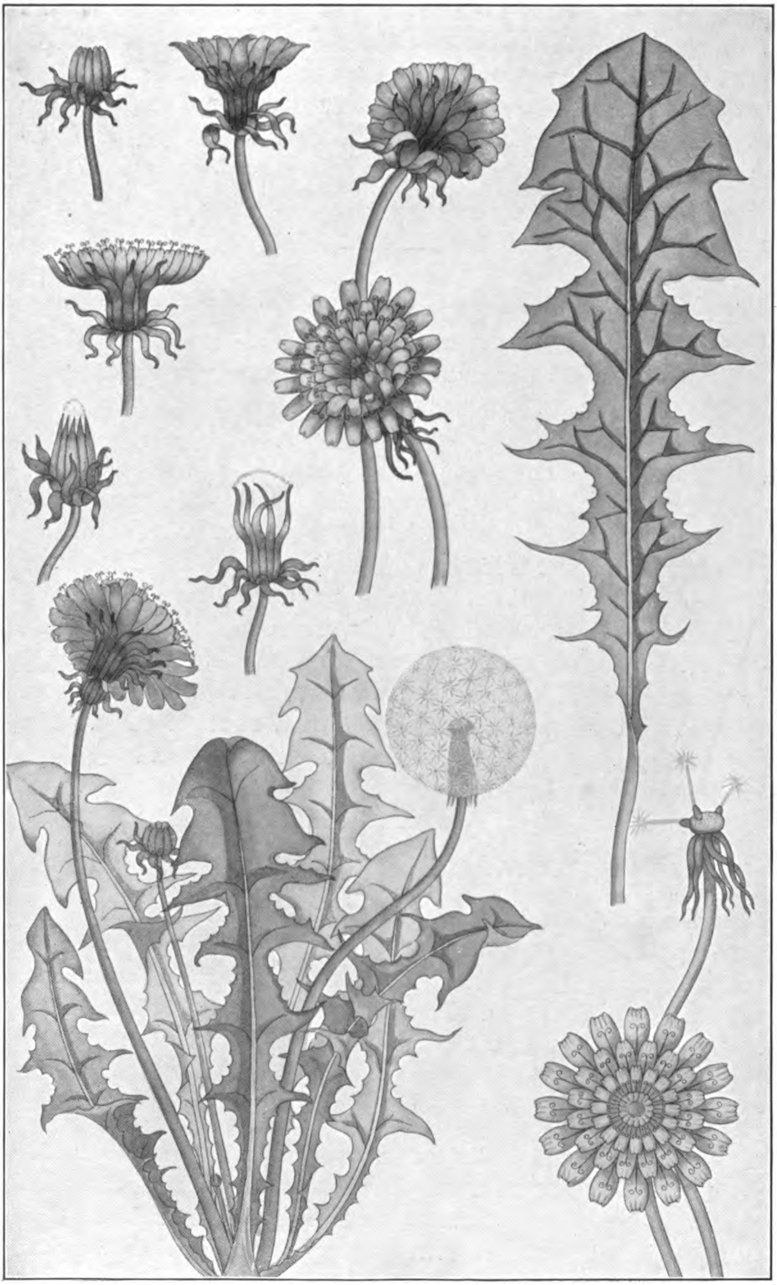

FIG. 13

studies of it in this illustration serve to emphasize its characteristics. The beautiful rendering of the sharply indentated leaf, the delicate, crystal-like, globular enclosure of the seed vessel, the simple, star-like expansion of the full blossom, and the relation of light and shade values in the conventional cluster are all clearly shown. The light and shade here is not natural but conventional; the background leaves are lighter than the foreground leaves and show their positions by contrast of color. The stems are occasionally expressed by a darker tone and equally often by a lighter value or a strip of

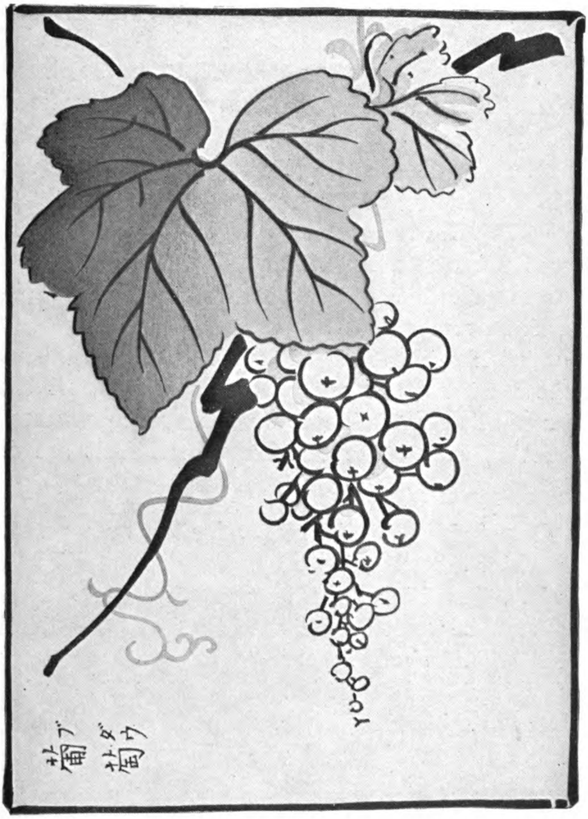

Fig. 14

white showing through. No attempt has been made at portraiture, but simply a record of the characteristics of the plant.

42. Broad Methods of Sketching and Rendering. The studies of plant forms in Figs. 5 and 13 are essentially pictorial and detailed, but the student should also become used to a broader method of sketching and rendering. Make the strokes in all such broad drawings of plant studies bold and free. Do not attempt to make them stiff, symmetrical, or thin and unvaried in width. Let them break at intervals where it is convenient to stop the end of a stroke. Let all drawings be truthful, and if a line is drawn in two strokes with a brush or pencil, do not make it appear as if it were drawn in one stroke. In Fig. 14, a Japanese drawing of the leaf and fruit of the native currant, no attempt has been made to detail each form laboriously. The whole is sketched in rapidly but skilfully, and expresses in the outline and veining of the leaf, in the jagged irregularity of the stem, in the peculiar clustering of the fruit and the curling of the tendril, all the characteristics of this plant. The American grape possesses similar characteristics, except the bunches of the fruit are different in form.

43. The student should make, for his own practice but not to send in, a series of not less than ten studies like that shown in Fig. 15, using a separate type of plant for each study. The work can be varied from time to time by indicating the effect of light and shade by using two values, each one, however, being expressed as an independent wash from its neighbor and not as a blending of one value into another.

A specimen type of broad rendering for plant studies is shown in Fig. 15. For present practice work, these need not be done in colors but in several values of black-and-white washes.

Great care must be exercised or the study will degenerate into a naturalistic treatment. The purpose for which the study is being made should not be forgotten. When pictures are wanted, time should be taken to make good shaded drawings with pencil or water color; but in studying plant analysis for

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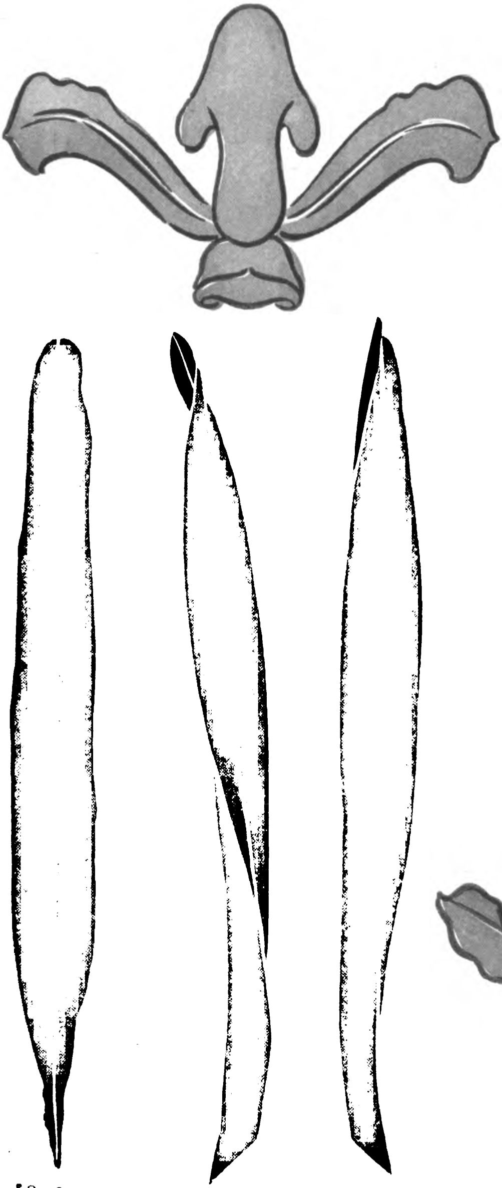
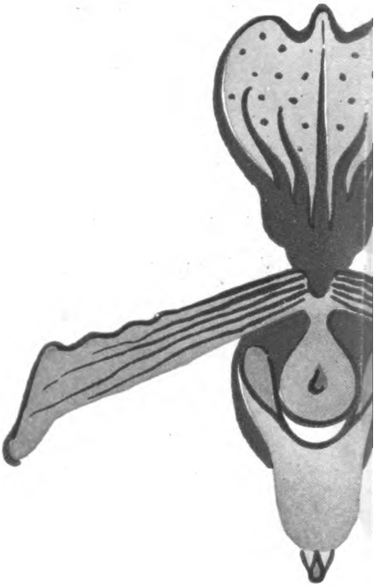




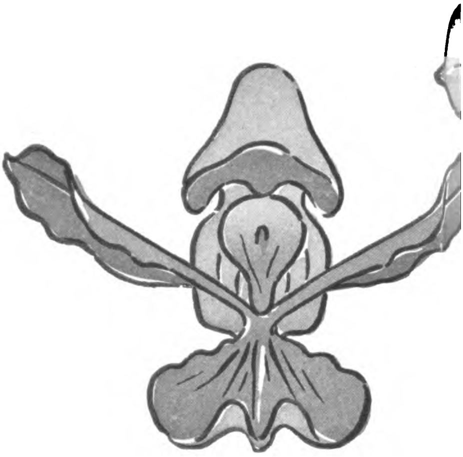
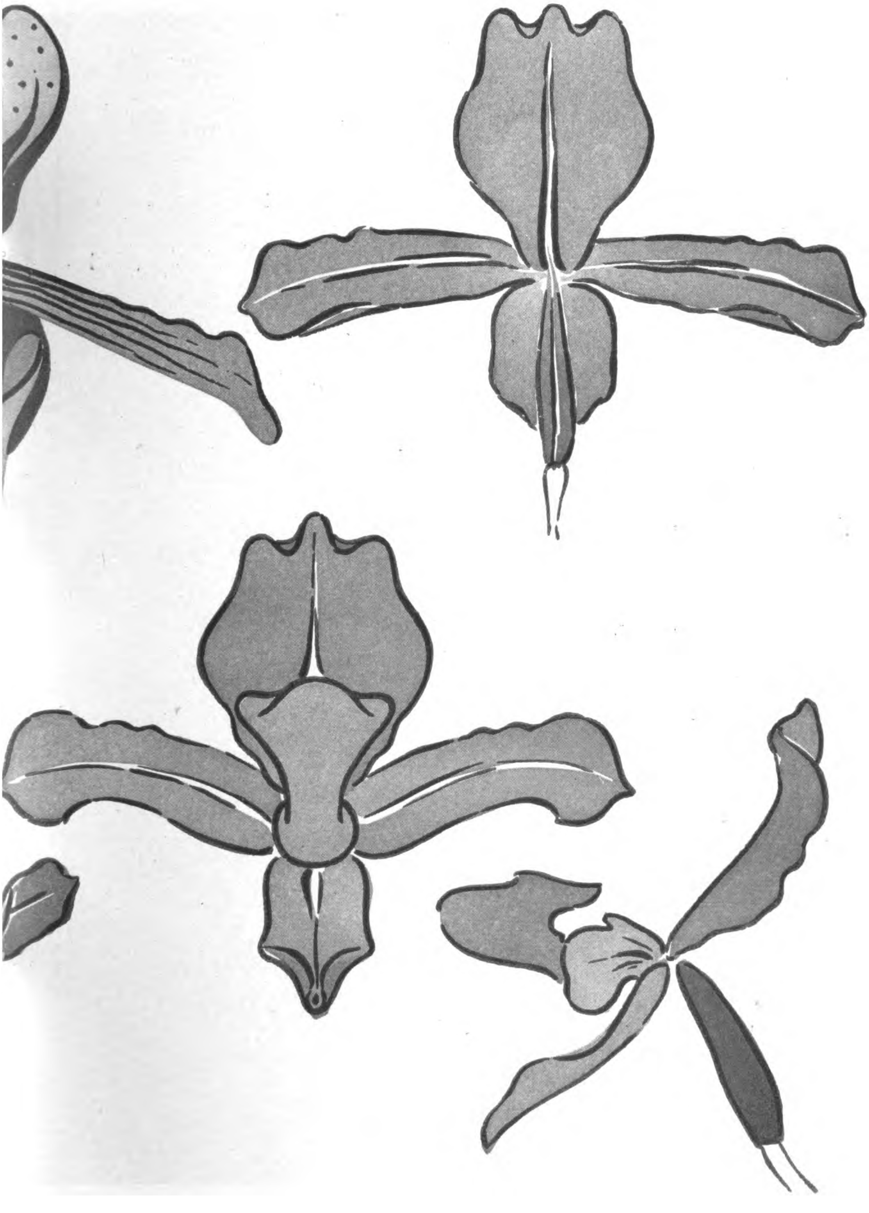


FIG. 15



design purposes, it should be borne in mind that the design represents characteristics common to every plant of its kind and not those of some individual specimen. In rendering the views of the leaves, as in Fig. 15, the back of the leaf, where it shows in the side view, could be rendered a lighter or a darker value than the front of the leaf, as this would likely be the case in nature; or one side of the leaf might be lighter or darker than the opposite side, the line of demarcation being expressed by the vein. These two sides could be expressed in different values, but this should be characteristic of all leaves and not of any particular specimen.

Such studies and renderings as these should first be drawn carefully in pencil and then filled in with flat washes and outlined with a heavy dark line laid on with a small brush. No attempt should be made to maintain a continuous wash from one part to another. For instance, where two sides of a leaf are expressed, the rib down the center can best be expressed by leaving a narrow stripe of the white paper. No attempt at light and shade should be expressed, although more than one value may be employed in order to express the different parts.

44. The washes used need not necessarily be the exact values that indicate the plant or even the blossom, as these are decorative studies and not portraits of the flower, and the student, in using a given plant as a basis of design, is at liberty to represent the conventional form of that plant in any values he chooses. Nor is the portrayal of color to be attempted naturalistically. In wallpaper, carpet, and other mechanically reproduced designs, flowers and their leaves are frequently expressed in two tones of the same color or in tones of different colors, neither of which is the characteristic color of the original flower or leaf. While this may, at first thought, seem incongruous, yet in this independence of color scheme lies the key to conventionalism. A floral form is adopted because it is beautiful; and when it is adapted to the purpose of design by reducing it to a conventional form, it is no longer a naturalistic flower and need no longer possess a naturalistic color.

In a drawing or a painting of any natural scene in pencil, India ink, or brown sepia, no one demands that the tree be green and the sky be blue, because it is recognized that the drawing is in sepia or in black and white. Likewise, when a conventionalized floral form is reproduced in a carpet or in a wall-paper, no one should demand that the roses should be red and the leaves should be green, for he should understand that this is a decoration and not a portrait.

45. **Plants and Flowers Suggested for Studies.** Every plant is worthy of study, though some lend themselves more readily than others to application in decorative design. The most prominent in these characteristics is the rose, both the single wild rose and the double or cultivated rose. The former is easy to draw, exceedingly adaptable to any decorative treatment, and is therefore the most prominent floral form in our modern decorative motifs. The poppy seems to be next in favor, and it admits of even a wider diversity of treatment than does the rose, owing to the greater variety in the form of the leaf and the flower, but, being difficult to draw, finds less favor with the unskilled. The iris, peony, thistle, daffodil, hollyhock, and numerous other bold, striking flowers are frequently seen in modern decorative designs.

46. **Overelaboration to Be Avoided.**—Time should not be spent in elaborating some unnecessary and useless detail, such as the accidental discoloration of a flower or a leaf, or the worm-eaten parts of a plant, while other details, characteristic of the growth itself, have been overlooked. Worm holes are not a detail of plant study from an art standpoint. If a design were to include insect life as well as plant life, the details arising from the relations of one to the other might be expressed; but accidental formations, discolorations, and deformities form no part of the conventionalizing of natural forms.

The drawing may express the fulness of life and vigor of the plant. Specimens for study should be typical of the species, and should be gathered while they are in full maturity and in the best condition. Many plants wither almost immediately after being cut and should, therefore, be studied while growing.

47. Another faulty characteristic of some work is the tendency to exaggerate details. The tendency in drawing a small object is to make it too small and to make a large object too large. Large, vigorous leaves and blossoms are frequently perched on the end of a thin, puny stem that in reality would not be able to transmit sap enough to support them. The tendency in the other direction is far more commendable if not carried to excess. The stem can afford to be thickened in plant analysis beyond its natural form, and large leaves and flowers may be reduced. In the analysis of small flowers it is far better that they should be drawn on a larger scale than on their own or a smaller scale. A reading glass or magnifying glass will assist the student in this work.

CONVENTIONALIZING PLANT FORMS

48. Definition of Conventionalism.—One of the greatest difficulties that the beginner in design experiences is the proper appreciation and application of conventionalism in his work. To the untrained mind, conventionalism is symbolic of stiffness, but nothing could be further from the truth. Simply stated, **conventionalism** consists in adapting the form to the purpose and material for which the design is made; it is a simple treatment of natural forms made necessary by the simple laws of beauty.

The designer can adapt to his purpose a form in nature, and conventionalize it so that it no longer represents the form, but it will be decorative and therefore worthy of its own existence. The Egyptian lotus, as seen carved and painted on the walls of the tombs and temples, is sufficiently like a lotus to call to mind the flower, and it is accepted as a decoration and not criticized as a portrait. On the other hand, the Greek anthemion is a similar decoration, but entirely free from any suggestion of the honeysuckle or other type on which it may have been based. The former is a case of conventionalism that does not destroy the type; the latter, a case where conventionalism has been carried so far that the original motif has become extinguished.

49. Incongruity of Designs That Are Unsuited to Material.—The evidence of skill in a finished fabric is entirely out of place, unless the skill is intimately associated with the design. The weaver and the loom fixer are delighted as they display in triumph what appears to be a very commonplace portrait or engraving executed in monochrome. It is a picture, but woven on the loom. Infinite pains have been taken to arrange the machine and details of the harness or jacquards to produce something that is entirely outside of the province for which the loom was invented. If a picture were wanted, one infinitely better could have been produced by other means; and if a fabric were wanted, a superior fabric could have been woven with a more conventional design. Here is only a poor imitation of the engraver's art executed by the weaver. What would be said were the engraver to execute his pictures to appear as though they were composed of silk or cotton? In either case the fabric is useless for what it is, and unsuitable for what it imitates.

Any object of art should appear exactly and honestly to be just what it is; and to be most pleasing and satisfactory it must present the appearance of having been produced with great ease, and not with infinite pains. The simpler the appearance of a design, usually the more brain work is spent in making it. The loom has a legitimate province that should not be lowered or degraded by making it produce freaks. Conventionalism, therefore, consists in preparing natural forms to suit them to the material in which they are to be executed.

50. Pictorial Compared With Conventional Motifs. Design motifs in general may be divided into three classes: the *purely pictorial*, which reproduce the natural form or type on which they are based, as shown in Fig. 16; the *semiconventional*, or *decorative*, a slightly modified naturalistic rendering that may be printed, woven, or stamped on the fabric which receives it, without pretending to be different from what it is, as illustrated in Fig. 17; and the *purely conventional*, which in no way represents the natural form on which it is based, except to recall it to the mind, as shown in Fig. 18.

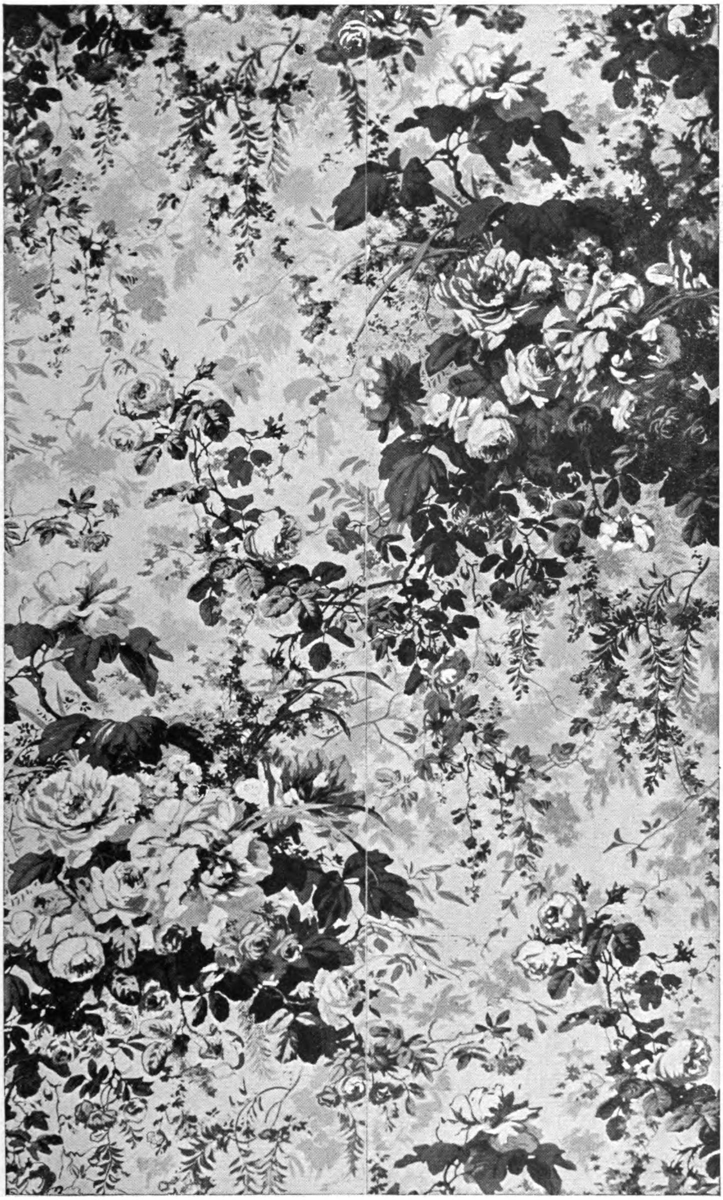


FIG. 16

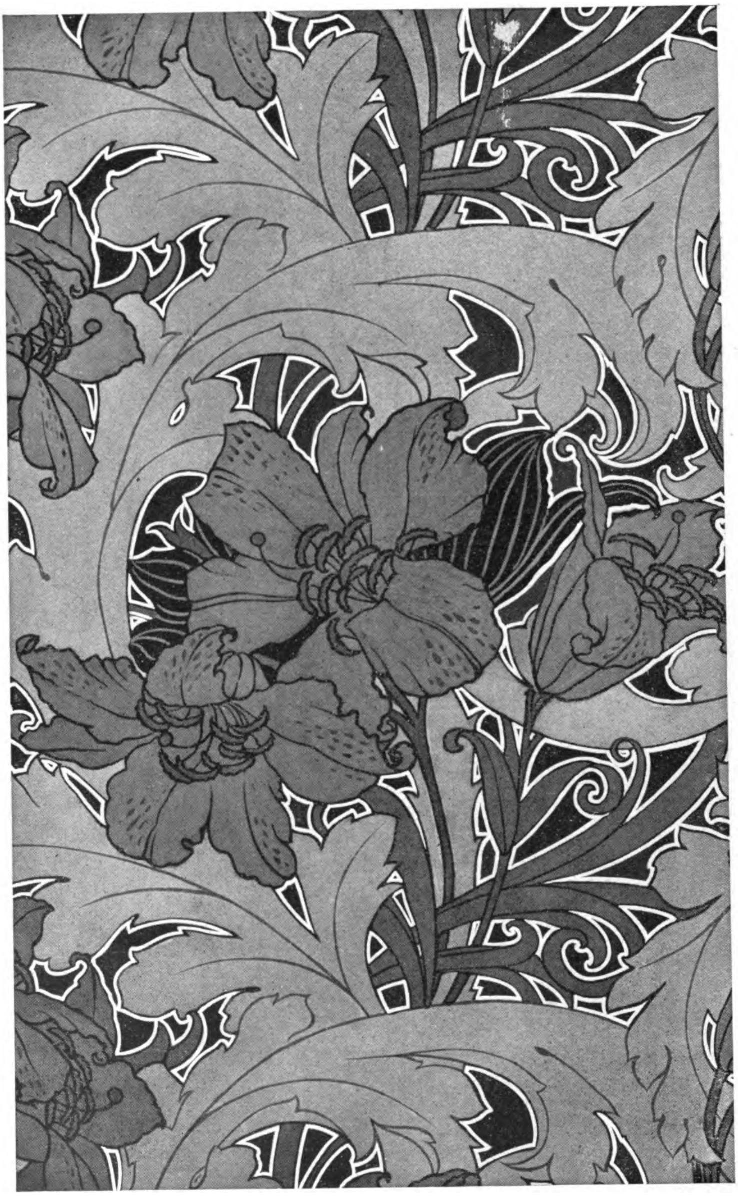


Fig. 17

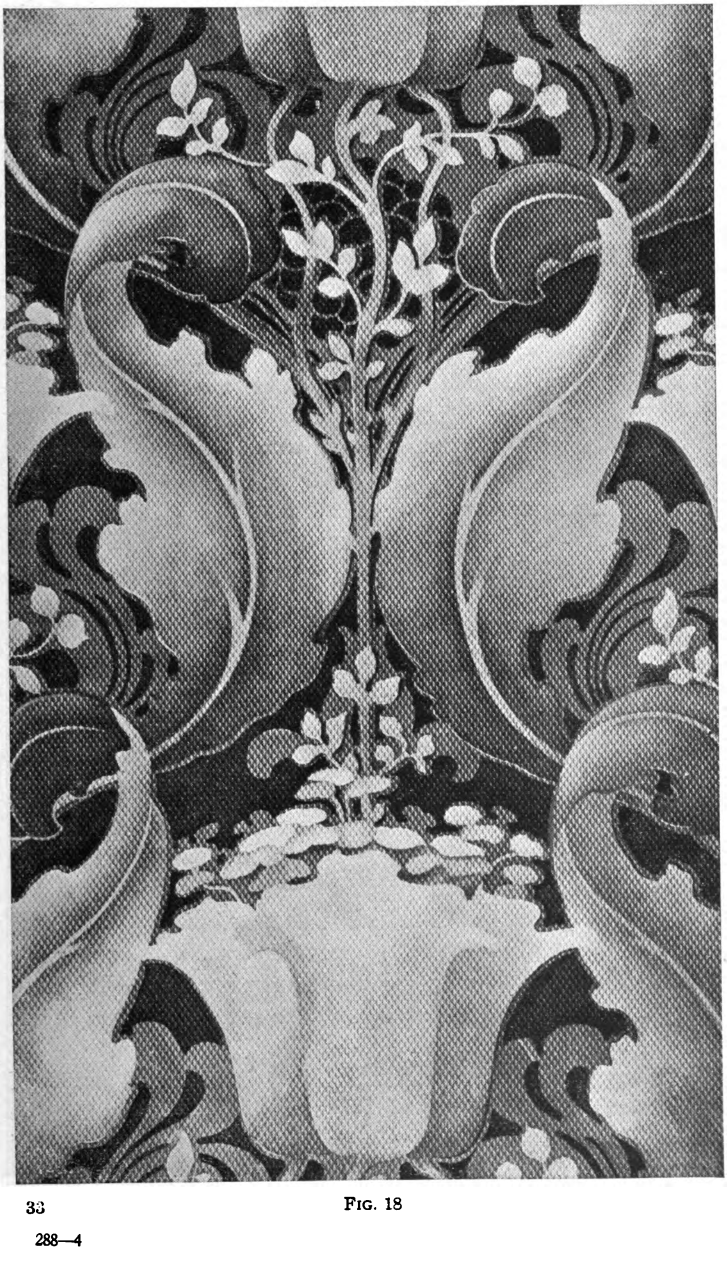


Fig. 18

It is not the purpose at this stage to introduce the student to finished designs, but simply to show various forms of design motifs. However, the difference between pictorial, semi-conventional, and purely conventional plant-form motifs can best be illustrated by showing them as they appear when used in designs. For this reason Figs. 16, 17, and 18 are introduced here.

51. Evolving Conventional Motifs for Designs.—The evolving of conventional motifs from natural forms requires not only ingenuity but also a very good sense of what is fitting in design. It necessitates a training in artificial treatment, in contradistinction to nature treatment that is a mere copying of a natural form. Conventional treatment is a step in advance of naturalistic treatment, although many persons (wrongly) regard it as a degradation of nature's forms to suit the necessities of machinery printing or weaving; consequently, an improperly trained designer endeavors to disguise the fact that his design is executed by the machine, and tries to represent it as a piece of hand work. This idea is just as wrong as the rendering of a picture in a piece of textile fabric. Nature furnishes us with an abundance of raw material that is studied by the artist and transmuted into design motifs. The accomplishment of this taxes the highest intellectual faculties that the designer possesses—his powers of invention and creation. The study of historic styles of decoration proves that each period when design reached a high standard has been marked by a more than ordinarily popular appreciation of the standard of the most cultivated artists; therefore, should the public become so trained that its taste is in accordance with that of the best artists, a period of perfect and universal art, similar to that which existed in Greece during the age of Pericles, might be expected.

In using purely pictorial motifs, irregularity or diversity of arrangement is aimed at; and the designer strives for the simulation of the picturesque element in nature. He endeavors to duplicate light-and-shade effects, dainty gradations of color, peculiar and even decided forms of leaf and flower, and to

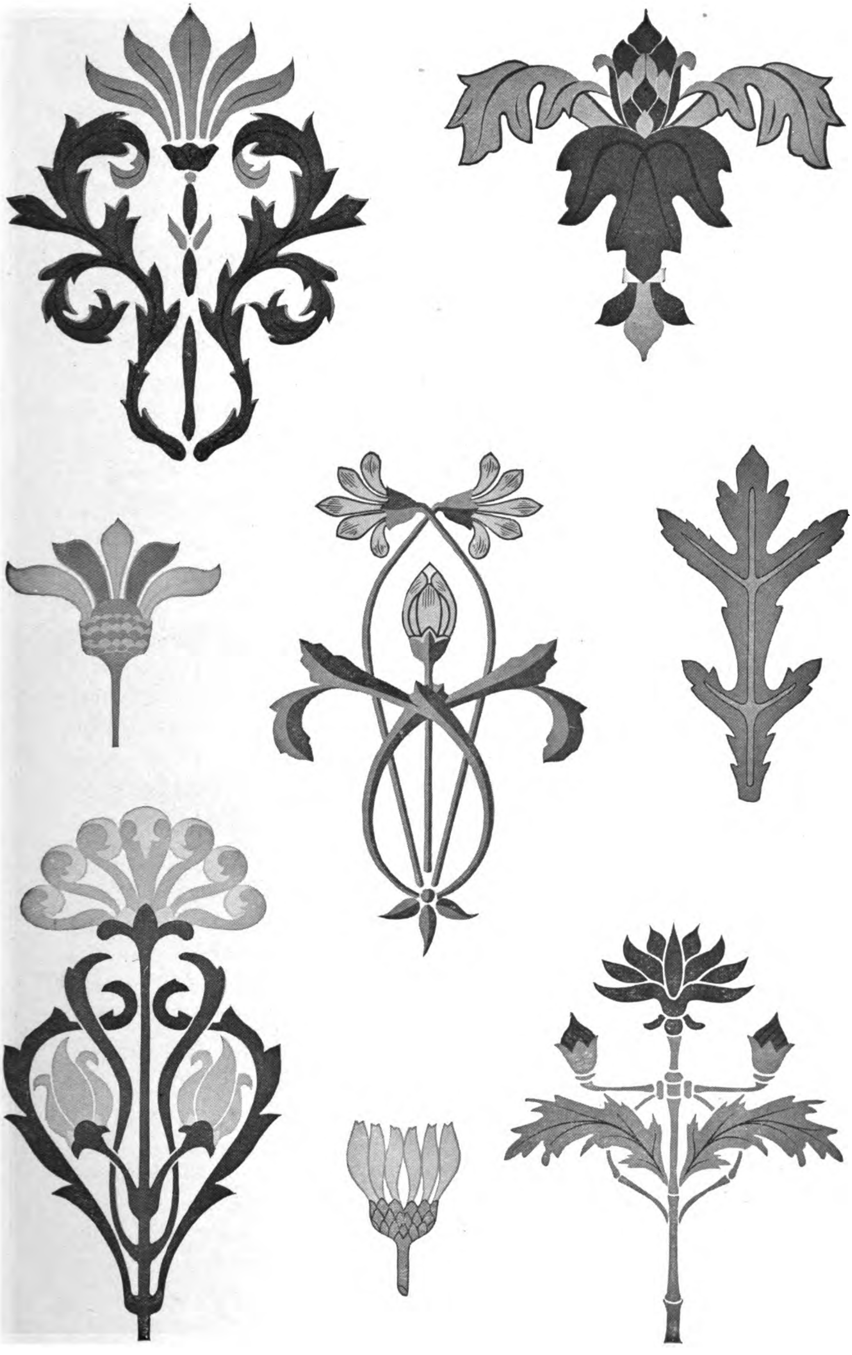


Fig. 19

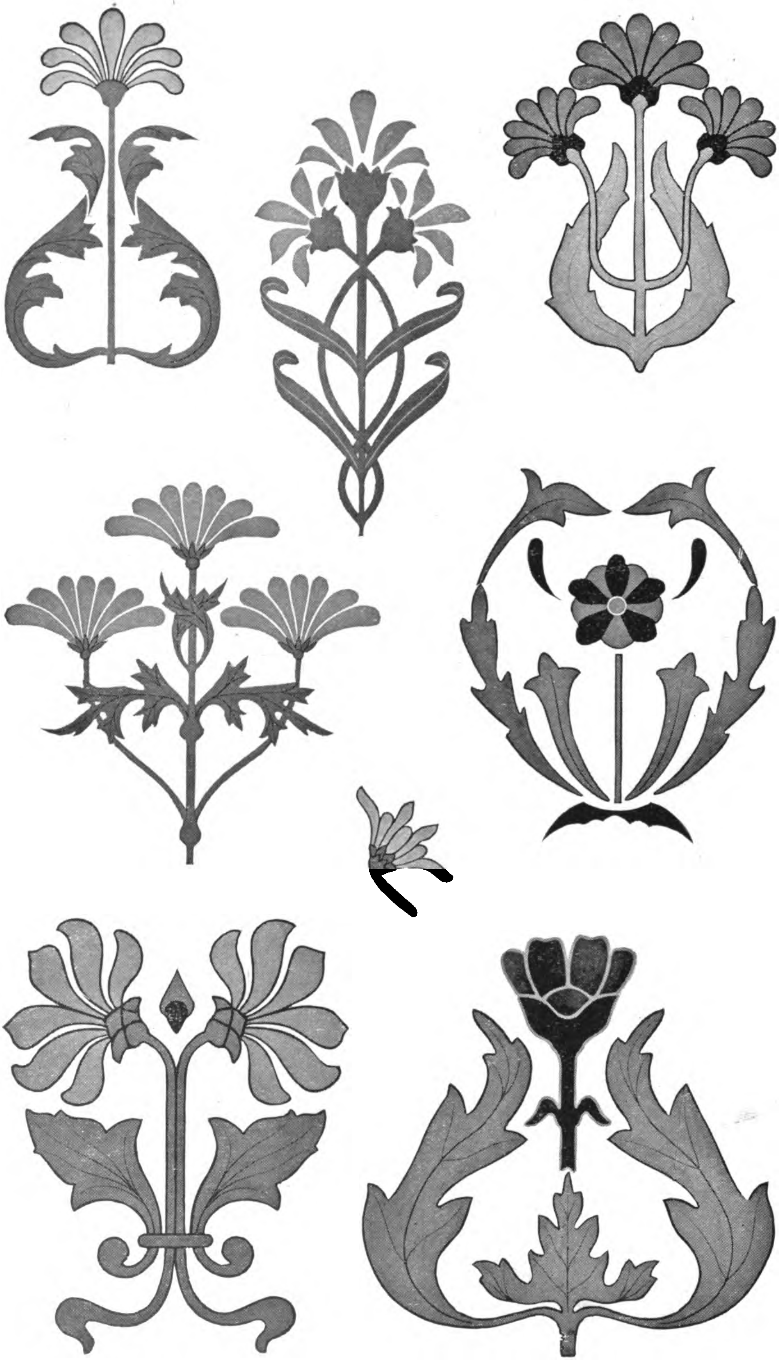


Fig. 20

counterfeit the original in every detail. But his productions are in no way suited for the purpose of designing, because they are usually not fit for printing or weaving by mechanical means, and require the highest grade of mechanical skill and machinery to produce them, at a cost unnecessarily great. A student, especially a beginner, should avoid preparing purely naturalistic designs. There is plenty of opportunity to dispose of designs that are less pictorial and call for less trouble and elaboration in manufacture. The designs that the manufacturer most desires are those that are beautiful in themselves and require the least effort in converting into a finished fabric.

52. Examples of Conventionalized Plant-Form Motifs.—As previously stated, there is little advantage, and perhaps there is positive harm, in showing to the student examples of conventionalized plant forms to be used as design motifs. The harm consists in the tendency on the part of the student to copy such forms or use them bodily, thereby defeating the purpose of the training given by this Section. Only by personal analysis of plant forms, and by actual conventionalizations, made by the student, can original motifs be devised.

However, the examples of conventionalized plant forms, and their resulting design motifs, shown in Figs. 19 and 20, are presented to give the student some idea as to how to go about conventionalizing such forms. All these design motifs have been devised from the daisy. In Fig. 19, the motif in the upper left-hand corner is composed of five conventionalized daisy petals surmounting a central vertical stem, on each side of which conventionalized leaves in profile grow up in scroll formation. The motif at the lower left-hand corner is composed of similar details similarly placed, but somewhat more elaborated than in the previous case. A careful study of each of the sixteen motifs or units illustrated in Figs. 19 and 20 will show just what parts of the daisy are used, how they were conventionalized, and how placed to form the design unit.

The student should now select some other flower, such as the rose, the violet, the nasturtium, etc., and evolve therefrom, for his own practice, a number of conventionalized motifs.

DESIGN-MOTIF EXERCISES

GENERAL INFORMATION

53. Required Work in This Section.—The only sure test as to the student's ability to prepare design motifs is to have him submit specimens of his work. Hence the required work in this Section is the preparation of arbitrary design motifs and plant-form design motifs along the lines of those previously described. Simply the design motifs as isolated units are to be prepared; there is to be no attempt at designing patterns or surface decoration; that work will follow in a later Section.

These designing exercises are to be in the form of drawing plates containing original work of the student in devising arbitrary motifs, and in producing plant-form motifs made direct from the actual plant forms—flowers, stems, buds, leaves, etc.—and then conventionalized.

The arbitrary motifs can be prepared without difficulty; and there is no season of the year when the student cannot secure some actual specimen of a plant or flower from which to prepare his plant-form motifs. If the usual sources, the field or garden, are not available, specimens can usually be procured from the florist or from potted plants in the home. The plant studies and designs *must* be made direct from the natural specimens, and *not* from other pictures.

54. Character of the Drawing Plates.—The drawing plates are to be four in number, each approximately 10 inches wide and 15 inches high, and divided by a horizontal center line into an upper and a lower rectangle, each 10 in. × $7\frac{1}{2}$ in., the exact size depending on the kind of paper used; this measurement is one-half of a demy size sheet of cold-pressed drawing paper. If a sketch pad or a sketch block is used, the sheets will of course be smaller. In case the 10″×15″ sheets are used, the plant studies and conventionalizations can be arranged very conveniently on one sheet to constitute the work of one plate. If the sketch block sheets are used, it will require several of the sheets to comprise one plate.

In each case it will be specifically stated whether the studies or designs are to be rendered in pencil or in wash.

PLATE 1

55. Exercise A, Plate 1.—In the upper 10″×7½″ rectangle of the plate arrange some arbitrary design motifs, along the lines of those shown in Fig. 1, based upon the square and the rectangle, and rendered in black or gray silhouette on the white back ground, using pencil, pen and ink, or brush and wash, as desired. Start with simple square or rectangular dot forms and work up to subdivided forms and combinations. Arrange these motifs in a pleasing manner within the rectangle, but make no attempt at pattern designing.

56. Exercise B, Plate 1.—In the lower 10″×7½″ rectangle of the plate arrange some arbitrary design motifs, based upon the triangle and the circle, and rendered in black or gray silhouette on the white background, using pencil, pen and ink, or brush and wash, as desired. Start with simple triangular or circular dot forms and work up to subdivided forms and combinations. Arrange these motifs in a pleasing manner within the rectangle, but make no attempt at pattern designing.

57. Final Work on Plate 1.—Letter or write the title, Plate 1: Design Motifs, at the top of the sheet, and on the back place class letters and number, name, address, and date of completion of the plate. Roll the plate, protected by a sheet of tissue paper, place in the mailing tube, and send to the Schools for examination. Then proceed with Plate 2.

PLATE 2

58. Exercise A, Plate 2.—In the upper 10″×7½″ rectangle of the plate make a set of naturalistic plant studies, direct from the actual specimen, of any selected plant or flower. Arrange these studies on the sheet similarly to the arrangements shown in Figs. 5 and 13, but render them broadly in pencil, according to the method illustrated in Figs. 2, 3, and 4, and described in the accompanying text directions. Make no attempt to conventionalize the details, nor to make patterns or designs.

59. Exercise B, Plate 2.—In the lower 10″×7½″ rectangle of the plate arrange conventionalized design motifs made from the naturalistic details drawn for Exercise A. Examples of conventionalized forms of plants, flowers, leaves, stems, etc., used as design units, are shown in Figs. 15, 19, and 20. The student must not copy, nor even adapt, any of the conventionalized motifs shown in the text. He is expected to make his own conventionalizations from the pictorial forms used in Exercise A.

60. Final Work on Plate 2.—Letter or write the title, Plate 2: Design Motifs, at the top of the sheet, and on the back place class letters and number, name, address, and date of completion of the plate. Roll the plate, protected by a sheet of tissue paper, place in the mailing tube, and send to the Schools for examination. Then proceed with Plate 3.

PLATE 3

61. Exercise A, Plate 3.—In the upper 10″×7½″ rectangle of the plate make a set of naturalistic plant studies, direct from the actual specimen, of any selected plant or flower, different from any used on previous plates. Arrange these studies on the sheet as before, but in this case render them in wash in a broad manner as illustrated in Figs. 14 and 15, and described in accompanying text. Considerable practice in brush-stroke work must be done before this plate of studies is attempted. Make no attempt to conventionalize the details, nor to make patterns or designs.

62. **Exercise B, Plate 3.**—In the lower 10″×7½″ rectangle of the plate arrange conventionalized motifs made from the naturalistic details drawn for Exercise A. Although examples of conventionalized design motifs are shown in Figs. 15, 19, and 20, the student must not copy nor adapt any of the forms shown in these illustrations, but must make original conventionalizations.

63. **Final Work on Plate 3.**—Letter or write the title, Plate 3: Design Motifs, at the top of the sheet, and on the back place class letters and number, name, address, and the date of completion of the plate. Roll the plate, place in the mailing tube, and send to the Schools for examination. Then proceed with Plate 4, if all required uncompleted work on previous plates has been finished.

PLATE 4

64. **Exercise A, Plate 4.**—In the upper 10″×7½″ rectangle of the plate make a set of naturalistic plant studies, direct from the actual specimen, of any selected plant or flower, different from any used on previous plates. Arrange these studies on the sheet as before, but in this case render them in wash in a careful, detailed manner, as illustrated in Fig. 13 and described in the accompanying text. Before any of these detailed wash studies are attempted, a great deal of practice work in detailed wash rendering must be done. Make no attempts to conventionalize the details, nor to make patterns or designs.

65. **Exercise B, Plate 4.**—In the lower 10″×7½″ rectangle of the plate arrange conventionalized motifs made from the naturalistic details drawn for Exercise A. Although examples of conventionalized design motifs are shown in Figs. 15, 19, and 20, the student must not copy nor adapt any of the

forms shown in these illustrations, but must make original conventionalizations.

66. Final Work on Plate 4.—Letter or write the title, Plate 4: Design Motifs, at the top of the sheet, and on the back place class letters and number, name, address, and the date of completion of the plate. Roll the plate, place in the mailing tube, and send to the Schools for examination.

If any redrawn work on any of the plates of this Section has been called for and has not yet been completed, it should be satisfactorily finished at this time. After all the required work on the plates of this Section has been completed the work of the next Section should be taken up at once.

DESIGN COMPOSITION

PURPOSE

1. **Second Stage in Learning to Design.**—When one has learned to devise design motifs of various kinds, and has become familiar with them, the next step is to combine these motifs so as to make designs. This combining, or putting together, of the individual motifs, requires a knowledge of the principles on which it is done, and actual practice in evolving designs based on various kinds of groundwork. This work, which is termed **design composition,** may be considered the second stage in learning to design, and is covered in this Section. The work of applying these design principles to spaces of different shapes and sizes, and to solids, which is known as space filling, will be discussed in the following Section.

2. **Design Composition Based on Exact Laws.** Designing does not consist of putting on paper the records, or memoranda, of mere random, haphazard thoughts that drift aimlessly through the mind of some so-called inspired dreamer. The making of a design is influenced from all sides by definite, practical considerations, among which the purpose for which it is intended, and the material in which it is to be executed, are the most binding. But, aside from these practical considerations, even the mental planning of the design is subject to definite laws and principles.

The chief purpose of artistic design is to achieve beauty, whether that beauty is to be considered for itself alone or is to be combined with some utilitarian purpose. But the securing of beautiful effects in lines, values, or colors is not a matter of

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chance or accident. Beauty depends on, and is the result of, following definite laws and principles, just as do good music and good literature.

These principles of design, when presented in logical sequence and classified, as will be done in this Section, must not be looked on as something to be committed to memory like rules of grammar and chemical formulas, but must be considered only in their application to actual designs. These principles must not only be understood in an intellectual way, but must also be actually *seen* in the various examples of designs illustrated.

PRINCIPLES OF DESIGN COMPOSITION

3. **Meaning of the Term Composition.**—Assuming that the purpose of designing is to secure beauty, **composition** in design work means an orderly and harmonious arrangement of parts; that is, of the design motifs or units. Composition, therefore, consists of grouping and arranging spots, lines, and masses so that, in themselves, they will present a pleasing relation to one another.

Unless the various parts of a design are arranged in an orderly manner, they are simply isolated parts, and there is nothing of interest or value produced. Suppose six matches or toothpicks are allowed to fall in an indiscriminate heap on a sheet of paper; there is no order or harmony; in fact, there is disorder. But if these sticks are arranged in orderly relation to one another; that is, so as to make patterns with them, there is at once harmony, and, therefore, *composition* is shown. The six matches or toothpicks may be so placed that the inner end of each one touches the inner ends of all the rest, the bodies of the sticks spreading out fanwise, like a sunburst. Again, they may be arranged as the sides of a hexagon; or, as another arrangement, they may be laid to form a six-pointed star. No matter what the orderly arrangement is, there has been expressed composition in design; that is, a **design** has been produced.

It is not by line arrangements only that design composition is expressed. There must also be considered the orderly arrangements and relations of outlined spaces and their relative sizes and shapes; the relative tone values of masses of black, gray, and white, together with their sizes and shapes; and the relations of masses of colors; that is, their relative color values.

The elements comprising design composition; that is, the principles that underlie all work of designing, will now be considered.

4. Unity.—In the foregoing discussion of the meaning of composition in general, the experiment with the six matches

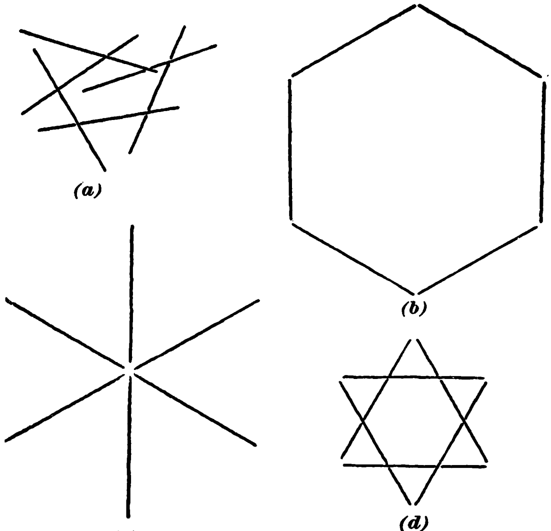


FIG. 1

or toothpicks was referred to as showing one element of design composition, namely, unity. This is illustrated in graphic form in Fig. 1. In (*a*) are shown six lines of equal length that bear absolutely no relation one to another and are therefore meaningless and of no interest, being disconnected and scattered. But, when grouped so as to form a hexagon, as in (*b*), or a sunburst, as in (*c*), or a six-pointed star, as in (*d*), they express a uniform idea from which no one of them could be removed without a feeling of incompleteness. This composite arrangement of lines that forms a complete idea is termed **unity,** inasmuch as the lines, when grouped, no longer are separate elements, but form the unit of a design.

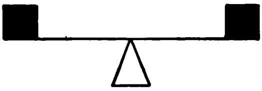


FIG. 2

Similarly, if the different units in the drawing or design were outlined shapes instead of merely lines, or if they were masses of black, gray, or colors, this same principle of unity would have to be established as the first principle of composition in design.

5. Balance.—Unlimited combinations of lines and masses can be made, all expressing unity; but some of them will be more pleasing than others, depending on the care with which these lines and masses have been arranged so that each will keep its proper place without being unduly emphasized. Such proper arrangement is called **balance.**

The proper balance of outlined spaces, or of tone and color masses, in any drawing, is arranged subject to the same laws that govern the balance of actual physical weights. For instance, when a board is balanced evenly, as in the case of a seesaw, its center must be over the point of support; also, if a weight is placed on one end of the board, the balance can be maintained by placing an equal weight on the other end, as shown in Fig. 2.

If, however, the weight on one end of the board is moved toward the point of support, it must be made heavier, if the balance is to be maintained; on the contrary, the farther the weight is removed from the center, the lighter it may be and still balance the one on the other end. Thus, a weight of 100 pounds placed half way between the end of the board and the point of support can be balanced by a weight of 50 pounds placed on the extreme other end, as shown in Fig. 3. Applying this principle to the balancing of outline shapes and tone masses in a design, it is found that the two black masses in Fig. 4 (*a*) and (*b*) balance each other perfectly, because they are of equal size

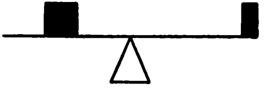
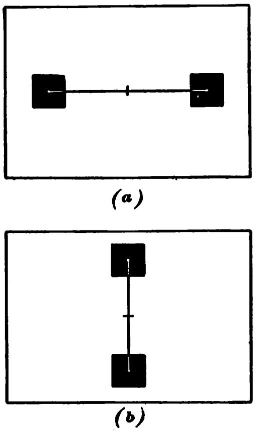


FIG. 3

and weight, and are the same distance from the center, corresponding to the point of support. But, if one of these spots were gray or white, the two would not balance in the position shown, because the gray or white spot would be lighter in tone value; and, to balance the black one, it would have to be increased in size. This is shown in Fig. 5, where the gray spot *a* is twice the size of the black spot *b*, but its light-and-shade value is only half as strong, or heavy, as that of *b*, and therefore these two are perfectly balanced when equidistant from center *c*. In Fig. 6 the lighter value *a* is balanced by the darker, or heavier, value *b*, although *b* is only one-fourth the size of *a*. Being one-fourth the size and twice the strength, or weight, in tone value, *b* has half the value of *a*, and balances with *a* when placed from *c* a distance twice as great as *a* from *c*. In general, these same principles apply to the balance of black or gray values as against white values.


(*a*)

(*b*)

FIG. 4

6. Application of Unity and Balance.—In discussing unity it was stated that, in arranging abstract lines so as to become patterns, it was possible to make some arrangements more pleasing and interesting than others. What has already been learned about the principle of balance will make plain how this may be done. In Fig. 7, (*a*) to (*f*), are shown line arrangements expressing unity, but also showing balance. The square at (*a*), divided into two equal areas by the vertical line, shows

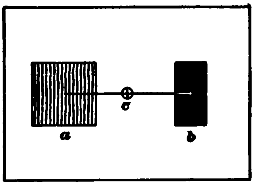


FIG. 5

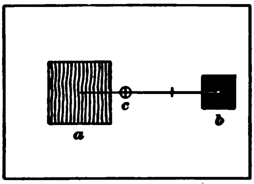


FIG. 6

exact symmetrical balance of the two rectangular spaces just as symmetrical balance from the standpoint of physical weights and of equal masses was shown in Figs. 2 and 4 (*a*). The application of these physical forms of balance to visual balance, or apparent balance or equal distribution of areas, is this: Whereas

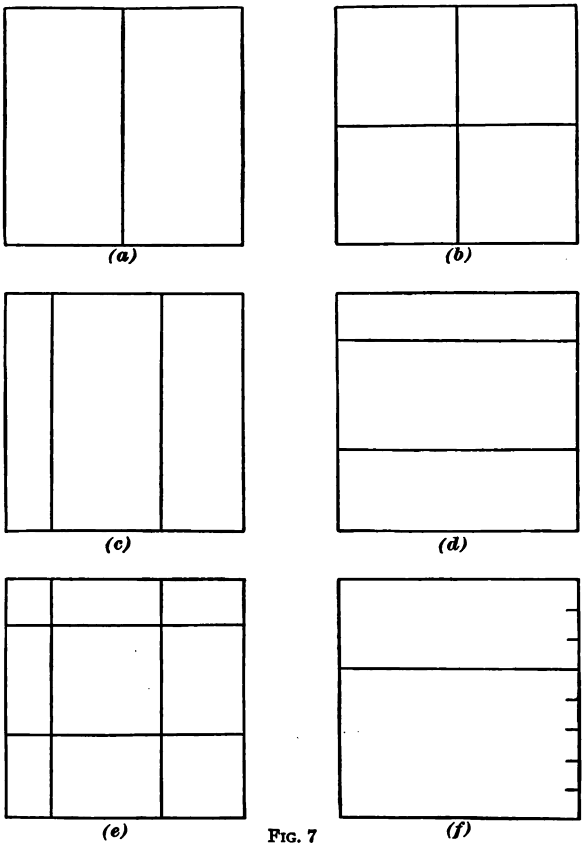


FIG. 7

in Fig. 2 physical balance was shown by placing equal weights at equal distances from the point of support, in Fig. 7 (*a*) balance is shown because the vertical center line is midway between the two large equal rectangular spaces, thus serving in the same capacity as the fulcrum or point of support in Fig. 2, and balances the two equal areas. In a similar manner balance is expressed in (*b*), both vertically and horizontally, because the lines drawn through the square are both center lines, and not only are the rectangles balanced, but the squares all balance equally around the central point where the two center lines intersect.

In (*c*), (*d*), and (*e*), however, the balance is no longer symmetrical balance, but is balance of the character shown by physical weights in Fig. 3, and graphically by masses in Figs. 5 and 6. It is not easy to explain just how such principles of physical and mass balance can be applied to distribution of spaces, as in Fig. 7 (*c*), (*d*), and (*e*); rather, it must be seen and felt. In Fig. 3, for instance, the smaller weight, or mass, is farther from the point of support than is the larger; and in Fig. 7, (*c*) and (*d*), this same idea is carried out, because in each case the smaller mass, the narrow rectangle, is farther from the imaginary center line of the square than is the larger mass, the wider rectangle. The same principle is illustrated in (*e*). These principles of balance of shapes and distribution of areas will be more clearly demonstrated when Fig. 8 is studied. From these diagrams, and the principles underlying them, is derived the fact, as shown in (*f*), that the most pleasing, because the best balanced, distribution of vertical areas in a panel or square is when three vertical heavy parts are assigned to the upper space and five light ones to the lower, as more clearly indicated in Fig. 8 (*f*).

The arrangements in Fig. 8, (*a*) to (*f*), illustrate balance of tone masses, all based on the arrangements of outlined spaces in Fig. 7. In Fig. 8 (*a*) the two tone masses balance each other exactly and symmetrically, because they are of the same size and tone value, and are arranged equally on each side of a vertical center line.

In Fig. 8 (*b*) the balance is also exact and symmetrical, vertically and horizontally, because the masses are of the same size and tone value. It is evident that (*a*) and (*b*), while showing exact balance, are not so interesting as the remaining examples, (*c*), (*d*), (*e*), and (*f*). In (*c*) the narrow black space at the left balances the larger white and gray spaces at center and right, because, though smaller, it is just as dense and heavy.

Similarly, and for the same reason, in (*d*), the black space at the top balances the two lower spaces, the white and gray. In (*e*), the vertical and horizontal arrangements are combined, but still illustrate the principle of small black masses balancing large gray or white masses. In Fig. 8 (*f*), the upper dark-gray mass balances the lower light-gray mass, the actual space relation being about three to five, as explained regarding Fig. 7 (*f*).

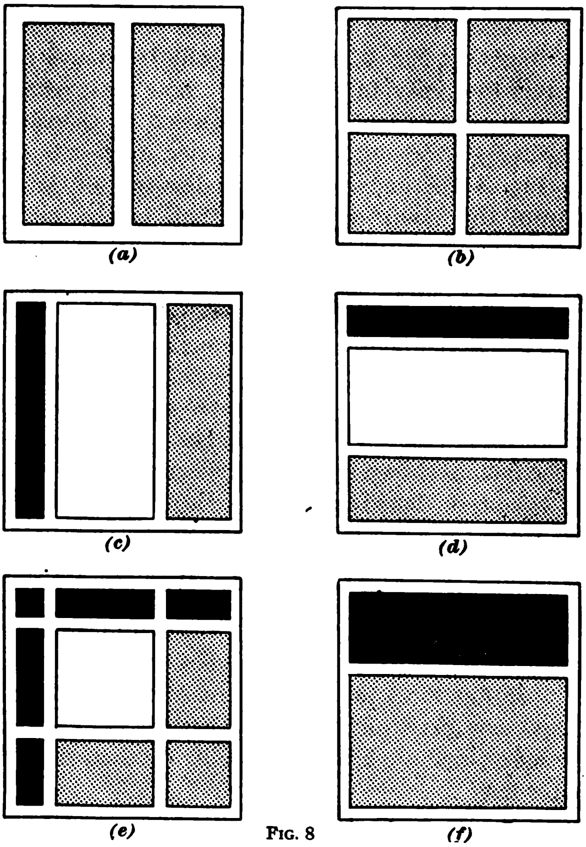


FIG. 8

The diagrams in Fig. 8 (*c*), (*d*), (*e*), and (*f*), are simply graphical applications of the mechanical principles of balance of blacks, grays, and whites shown in Figs. 5 and 6. The student should plot out for himself other diagrams, illustrating these principles. He should not look on these as abstract diagrams, but should remember that they typify how the motifs and elements that are used in a design should be arranged so that the design may be properly balanced. The application of this principle of balance will be further discussed in another Section.

7. Rhythm.—A very important element in design composition is **rhythm**; that is, the consistent and systematically varying relation of parts or values in a design that gives it charm and interest and prevents monotony. The rhythm may be in the parts or details of the design, or in the tone or color values.

8. Rhythm and Harmony of Lines. In Fig. 9 (*a*) nine vertical lines are shown within the rectangle, all the same length, and the same distance apart. While there is unity and, in some degree, balance, yet there is monotony, just as there would be if a pianist would strike the same key nine times in succession. But in Fig. 9 (*b*), the first, third, fourth, sixth, seventh, and ninth strokes have been made shorter than the second, fifth, and eighth strokes, with the result that the strokes occur in this regular order: short–long–short, short–long–short, short–long–short. In (*c*), the idea is carried still

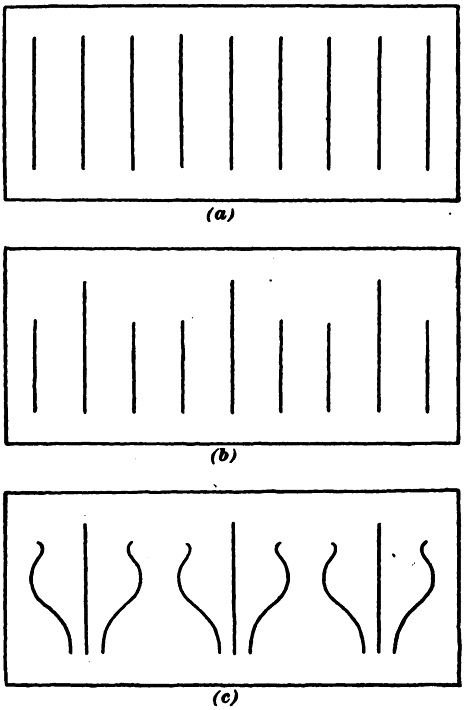
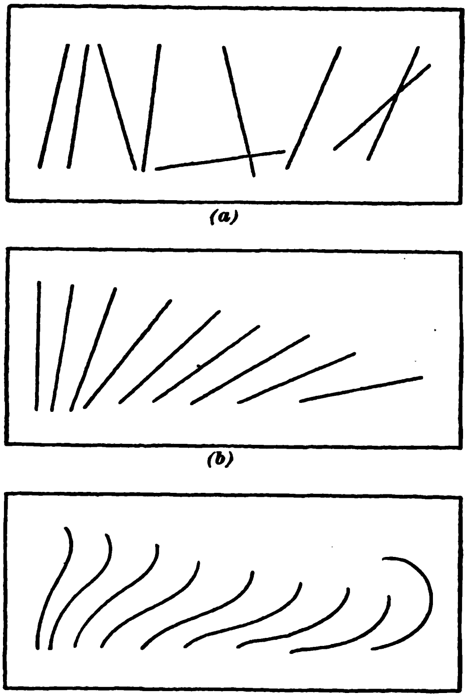

(*a*)
(*b*)
(*c*)

FIG. 9

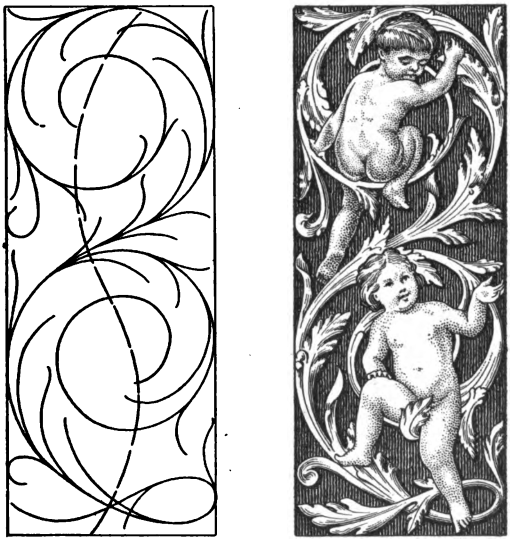
further by making the two short strokes adjoining the long ones symmetrically curved, as shown. Thus, in both (*b*) and (*c*) is shown related movement; a continuous, alternating rise and fall, like that of the waves of the sea, or of the tonal rhythm in a musical composition; in design, this effect is termed rhythm.

Another form of rhythm of lines is that where there is an orderly and consistent changing of relative direction or movement of parts in a design. In Fig. 10 (*a*) are shown nine inclined straight lines, none of them having the same direction, and presenting a very confused and disagreeable effect. In Fig. 10 (*b*) these lines are arranged so that each succeeding one slants just a little farther away from the preceding one than did that one from its predecessor, the whole series thus presenting a rhythmic movement that is pleasing. In Fig. 10 (*c*), the lines are made curved instead of straight and the wavelike effect is made even more pronounced, and thus rhythm is expressed.


(*a*)
(*b*)
(*c*)
Fig. 10

9. Fig. 11 (*a*) and (*b*) illustrates how an establishment of the lines of rhythm, as in (*a*), enables the entire decorative composition to be drawn with pleasing effect as shown in (*b*). This figure will also illustrate a principle of composition associated with rhythm, namely **harmony**. While the term harmony,

as used in art, is usually applied to the proper relation of colors, yet there is also harmony of line and mass in composition. In this connection harmony means appropriateness or fitness. For instance, in Fig. 11 (*b*), the figures of the two children and the lines and masses of the scroll and the leaves fit well within, and are perfectly adapted for, the shape of the enclosing space. Such a scroll with the two figures would not fit well within a square; there would be lack of harmony. From this elementary principle the student can well understand that such fitness must be considered when a design is laid out, in order that harmony may be expressed.



(a) FIG. 11 *(b)*

10. Rhythm and Harmony of Tone Values.—But rhythm and harmony apply not only to lines and outlined shapes. There must also be rhythm of tone values. Just as the eye is carried along in orderly related movement by the proper placing of rhythmic lines, so it can be, and should be, carried along in orderly sequence by the tone values in a design.

In Fig. 12 are shown five tone values, made from wash drawings, in proper order; (*a*), black; (*b*), dark gray; (*c*), gray; (*d*), light gray; and (*e*), white. In Fig. 13 are five tone values in similar order, made from line drawings. Close inspection of Figs. 12 and 13 will show that the relative differences in tone value between any two adjoining squares are the same. For instance, in (*c*), in both Fig. 12 and Fig. 13, the tone value is just as much lighter than in (*b*) as that in (*b*) is lighter than in (*a*). Thus, orderly rhythm or movement of decreasing tone values is expressed.

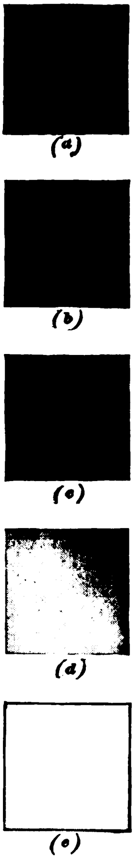


FIG. 12

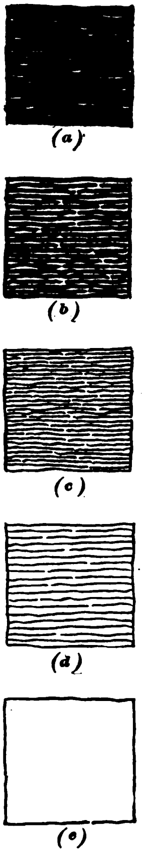


FIG. 13

Figs. 14 and 15 are examples of lack of rhythm, and when these two are compared with Fig. 16, where smooth rhythm of values is expressed, this principle will be better understood. In Fig. 14 the contrast between the tone values in (*b*) and (*c*) is so much greater than between those in (*b*) and (*a*) that there is no rhythm. There is likewise no rhythm in Fig. 15, because the transition from the tone value in (*a*) to that in (*b*) is much more abrupt than from that in (*b*) to that in (*c*); in other words, the tone value of (*b*) is much lighter than that of (*a*), though that in (*c*) is not much lighter than in (*b*). In Fig. 16, however, rhythm is correctly shown, for the values in (*a*), (*b*), and (*c*) progress evenly from one to the other, and the step from (*a*) to (*b*) is practically the same as that from (*b*) to (*c*), thus making an even progression that is smooth and satisfactory, and that gives a feeling of restfulness. Further, comparing these values with those of Fig. 13, it will be seen that the jump from (*b*) to (*c*), in Fig. 14, is practically the same as that from (*b*) to (*e*), in Fig. 13; while in Fig. 15 the variation in tone from (*a*) to (*b*) is practically the same as that from (*a*) to (*d*), in Fig. 13. In Fig. 16, however, the values in (*a*), (*b*), and (*c*) correspond to the values in (*a*), (*c*), and (*e*), Fig. 13, and therefore express rhythm; and the use of such related values in a design would give more satisfactory results than the use of unrelated values.

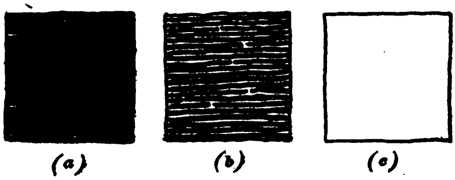


FIG. 14

11. Harmony as Applied to Color in Design.—The discussion of the term harmony in this connection has been applied only to lines and tone values in black and white; the matter of color has not been considered. The function of color in design is so important, and so many considerations underlie its correct application, that the discussions of color in design and color harmony have been reserved for a later Section, and will there be taken up in detail.

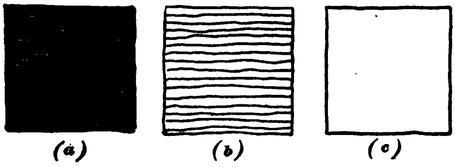


FIG. 15

12. Repetition.—The principles of repetition and alternation were involved in the discussion of rhythm, but may be considered still further. **Repetition** refers to the repeating or duplicating of a certain motif or unit of design, either along in a straight line or row, thus making a *running* design or border; or in all directions from a given point, which would be called a repeating, or *all-over*,

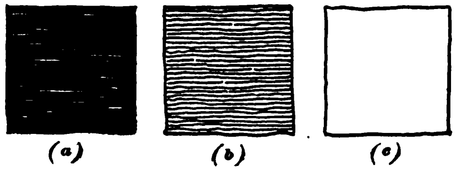


FIG. 16

pattern. Fig. 17 shows details of a design repeating laterally, constituting a border design; and Fig. 18 shows a spot of ornament repeating vertically and laterally, thus making an all-over pattern.

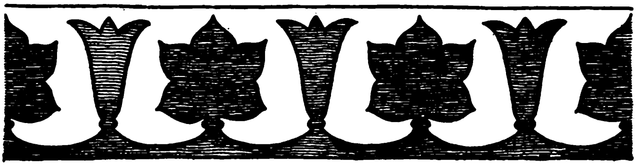


FIG. 17

13. Alternation.—In connection with repetition, in a good design, there is usually **alternation,** which means that the repetition consists of a form that is duplicated alternately with another form. This is also shown in Fig. 17, where the five-divisioned leaf alternates with the tall, three-pointed form, thus making a design in which there is interest. If there had been simply a row of seven five-divisioned leaves, or a row of tall, three-pointed forms, the design would have been monotonous. Thus alternation is used to vary repetition and avoid monotony. It produces a slight feeling of contrast combined with a feeling of continuous variation; but it must not be confounded with the principles of contrast and variety, which are separate and distinct.

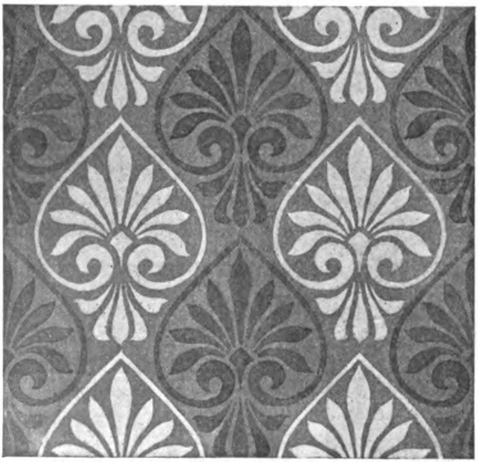


FIG. 18

14. Contrast and Variety.—The feeling of **contrast** is best expressed in a design wherein the linear elements meet or cross each other nearly at right angles, as shown in Fig. 19; and **variety** is best effected by an arrangement of lines and forms that brings about this condition, as shown in Fig. 18, which is an ancient Greek pattern wherein this principle dominates the entire design, all the lines being arranged to join each other nearly at right angles.

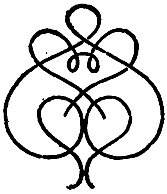


FIG. 19

The feeling of contrast is not confined entirely to designs of a rigid character, and Fig. 20 illustrates an example wherein this principle is carefully handled in a design of a soft and flowing character. In Fig. 20 will be observed the main flowing line broken by the scroll that crosses it at right angles, and, therefore, stands not only in contrast with it but also assists in giving a feeling of variety. Variety is the very essence of a design and the principle that gives it brightness and prevents its monotony, and though the variety of design must not be so extensive as to rob it of its feeling of repose, there must be sufficient change to rest the eye from the observation of any particular form.

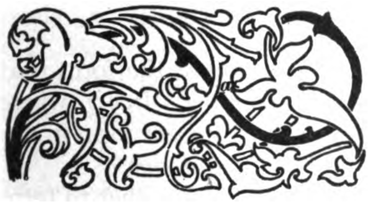


FIG. 20

15. **Symmetry.**—The principle of **symmetry** is allied in some respects with that of balance, previously discussed. However, symmetry is usually applied when the arrangement of details is such that on both sides of a line or point they are exactly repeated or duplicated, as shown in Fig. 21.

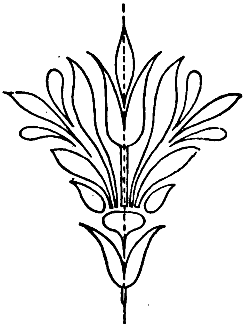


FIG. 21

Symmetry has many forms of expression, but usually may be considered to mean *likesidedness*, no matter what the form of the object may be. For instance, in Fig. 22, the various examples, from (*a*) to (*d*), are all symmetrical; that is, likesided, but in different ways. In (*a*) is shown a form of symmetry that consists simply of the arrangement and repetition of a given form each side of a center line; this is known as *bisymmetry*. In (*b*) is a similar arrangement where the forms on the sides are the same in detail as the form that separates them; this is known as *trisymmetry*. In (*c*), where there are a number of forms each side of a similar form in the center, there exists what is known as *multisymmetry*.

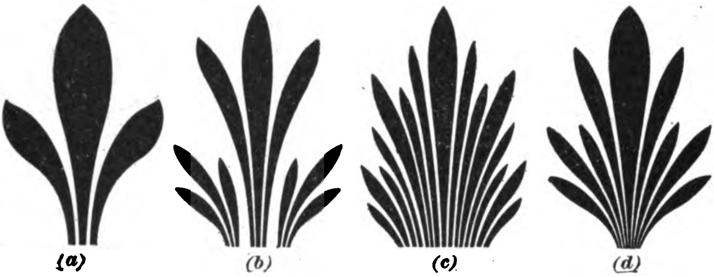

(*a*) (*b*) (*c*) (*d*)

FIG. 22

By bringing the forms shown in Fig. 22 (*b*) together to form a unity, we have an example of radiation from a point, as shown at (*d*), while the distribution of the forms along a center line, as shown in Fig. 23, gives an example of radiation from a center line.

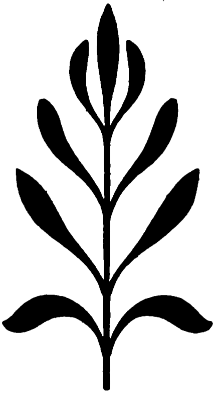


FIG. 23

16. Tangential Junction.—The principle of tangential junction is a detail in designing that depends on the close observation of nature. It is illustrated in Fig. 22, particularly in (*a*) and (*d*). It is also shown in Fig. 24, where on the left a scroll is shown joining onto, or branching from, a continuous curved line. The idea is that when the two curved lines meet they should be tangent to each other and not meet at an angle.

17. Radiation.—The principle of radiation has already been referred to, and may occur from a point or from line to line. It is a matter to be decided according to the character of the ornament, the principle being derived from observing natural forms, growing plants, veins of leaves, etc. The portion to the right in Fig. 24 illustrates radiation.

18. Growth.—The principle of growth, as in the case of radiation, is also derived from the observation of plant forms and how they grow. The student of nature knows that the tendency of growth in plants is upward and outward, usually in curving lines. In the case of long blades of grass, long leaves, as of the flag or iris, etc., this is particularly noticeable. The manner in which petals of flowers grow upward and outward from a central point also illustrates the principle of growth.

This principle of growth is applied in designs by arranging long sweeping lines growing upward from the bottom of a panel, as illustrated in Fig. 11, or outward from a common point, as illustrated in Fig. 20.

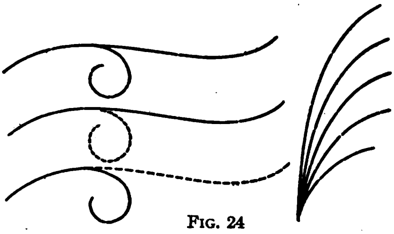


FIG. 24

19. Subordination. The principle of subordination must be introduced in certain parts of a design, in order to prevent monotony. There must be principal features and subordinate features; for if every detail is brought into equal prominence there will be neither contrast nor variety. In every good design there should always be a principal feature, such as a bright flower, a group of flowers or leaves, or some other striking object, and the rest of the design should sink into the background and take a secondary place.

20. Proportion.—The principle of proportion determines how large one part of a design should be in relation to the other parts, in order to look well. The designer must use his judgment and taste as to the proper relation between the scale of the pattern, the lengths and breadths of repeats, and the relative sizes of principal and subordinate features under different conditions of black and white, colors, etc.

21. Fitness and Fashion.—These principles are not strictly part of a consideration of the theory of design, but rather of the practical commercial application of design to definite purposes; but they may be referred to here.

The question of **fitness** is simply the application of a certain class of design to certain materials. Of course, it is evident that the style of design that would be suitable for a carpet would be utterly unsuitable for a printed cotton goods or a velvet, and would be out of place for printing on a fine silk. Then, there is always the consideration of **fashion**—a subject that every designer is bound to be familiar with and governed by, although his good sense may at times be opposed to it; but designs are made for commercial purposes, and the designer must bow to the prevailing fashions, even though his artistic nature rebel. Therefore, a design should always be thought out or mentally planned at first, and its style, scale, and character suited and fitted to the material and purpose in which it is to be carried out and for which it is to serve.

THE EVOLUTION OF A DESIGN

GENERAL CONSIDERATIONS

22. Use to Which the Design is to Be Put.—It has already been shown that a design is a drawing laid out for a purpose. That purpose is to lend beauty to some useful object, in such a way as to assist, not interfere with, the function of the article or fabric. The designer must, therefore, consider carefully the use that is to be made of the article or fabric on which the design is to be placed. A detailed discussion of this subject will be deferred until the matter of applied design is taken up.

23. Material in Which the Design is to Be Executed. Having given due thought to the use to which the design is to be put, the next consideration must be the material to be used in the actual carrying out of the design; and the limitations and variations therefore required. It is evident that it is easy to print or weave a pattern of any degree of elaborateness, but that the free reproduction of patterns in stone, for instance, is greatly limited by the hard, unyielding nature of the material. For this reason the designer could feel the greatest freedom in making a design for a decorative bookcover or ornamented page, or for a printed or woven fabric; whereas, his design for a pierced or carved stone panel, balustrade, or reredos, would of necessity consist of fewer and simpler forms. The subject will be more fully discussed when the matter of applied design is taken up.

PROCESS OF EVOLVING DESIGNS

DESIGNS FROM ARBITRARY MOTIFS

24. Use of Squared or Ruled Drawing Paper.—When the beginner has become proficient in devising arbitrary design units of various kinds, the next step is to make experiments in putting these units together in a symmetrical manner, carrying out the principles of good design, such as unity, balance, rhythm, harmony, etc., that were presented in the early part of this Section.

The work can be done easily and with marked success if squared or ruled paper is used. Sheets 8 in. × 10 in., or 10 in. × 15 in. will be found convenient, although the size is not important. Ruled or squared paper of this kind, with lines in pale blue, for engineering work or carpet and textile designing, may be purchased from art stores or companies dealing in draftsmen's supplies. The sizes of the squares may run anywhere from six to twelve spaces to the linear inch, eight squares to the inch being a convenient size.

However, if it is not convenient to purchase such paper, the squares, diamonds, triangles, or whatever is desired, can be easily ruled on the paper by the student. Along the top, bottom, left, and right, he may mark off eighths of inches from a foot rule or yardstick, then rule horizontal lines connecting the $\frac{1}{8}$-inch points along the sides, and then vertical lines connecting the $\frac{1}{8}$-inch points along the top and bottom. The result will be a series of squares, each $\frac{1}{8}$ inch in size. For some of the tests in evolving designs, it will be necessary to rule the paper into diamond or triangular shapes.

The object of these exactly ruled squares, diamonds, triangles, etc., is not to make the design mechanical or stiff, but to form a ground or basis that may be used to evolve the design from dots, lines, masses, etc., as the case may be.

25. Designs Evolved From Dots and Checks.—Designs are evolved from dots and checks in several ways:

1. *On a Background of Squares:* Perhaps the simplest way to start is by using dots. With a sheet of squared paper before him, the designer's purpose is to emphasize certain squares, at uniform distances, so that a design or pattern will result. Beginning at the upper left-hand corner of the sheet, dots are made as shown in Fig. 25 (*a*). A soft pencil with a rather dull point may be used, or a small brush (with the tip cut or burned off) and India ink or black pigment. Along the top row of squares, dots are placed in every alternate square. Then, in the third row from the top, the second row being skipped, a second series of dots is placed exactly under the first series. Similarly, in the fifth and seventh rows of squares from the top, dots are placed, the result being as shown in Fig. 25 (*a*). This is, strictly, a design, or pattern, but it lacks interest, because it possesses only two or three of the principles of good design; namely, unity, balance, and repetition. Therefore, an attempt should be made to alter and improve the design or pattern by introducing other design principles, and this is done in Fig. 25 (*b*).

In (*b*), the dots are placed in the squares, alternating both horizontally and vertically, as for (*a*), but with this change, that in the second, fourth, sixth, eighth, etc. rows from the top, which in design (*a*) were left blank, other series of dots are placed so as to come under the vacant squares of rows one, three, five, etc. This gives an entirely new and more interesting design, because new design principles have been introduced; namely, rhythm, harmony, alternation, contrast, etc.

In Fig. 25 (*c*) additional interest is secured by filling in the squares almost, but not entirely, with solid black, so as to form

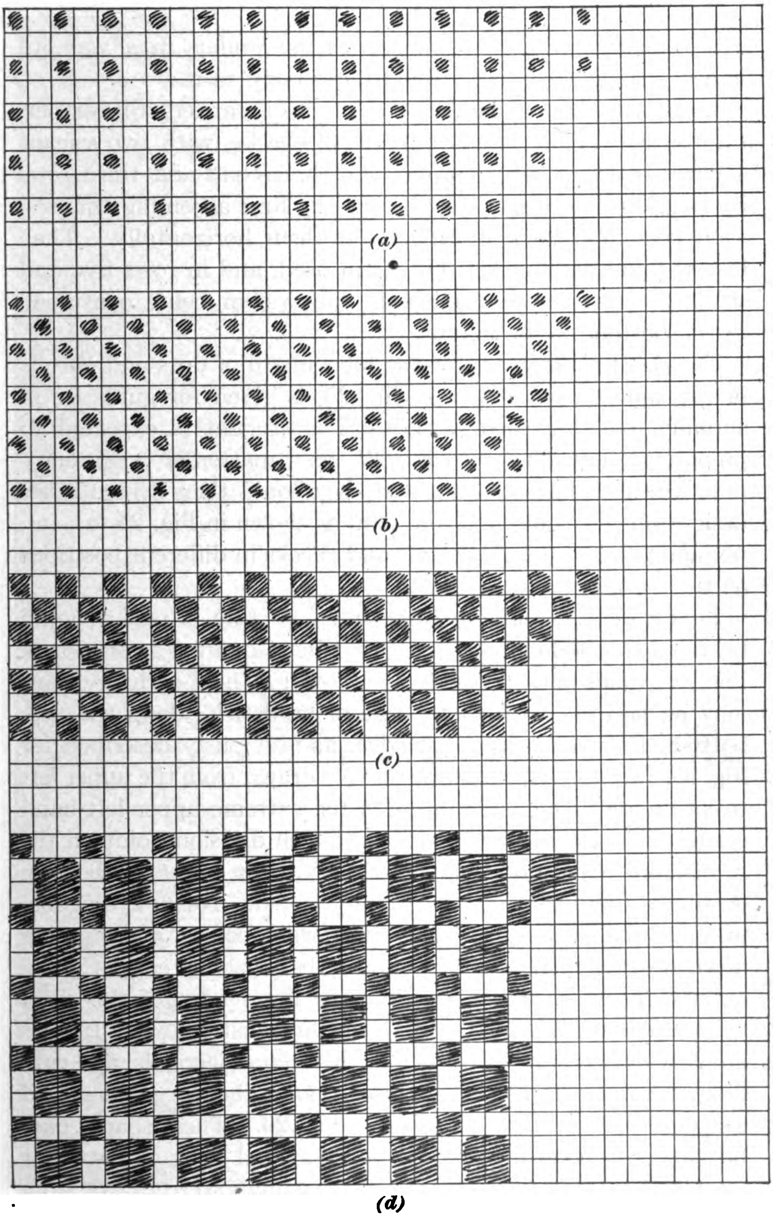


FIG. 25

little blocks or checks. The design is similar, in a way, to design (*b*) but has more strength and body to it.

In Fig. 25 (*d*), the plan of using checks is carried still further, the top row being occupied by small checks, with two vacant squares between, horizontally; and the second and third rows by large square checks, each occupying four adjoining squares, there being one check-width between them, horizontally. Then in row four, small checks are again used, and in rows five and six large squares are employed, this system being continued to the bottom of the figure.

The description given for the blocking-in of dots and checks in the squares, as shown in Fig. 25, is given for guidance in actually evolving such designs. The student is expected to prepare a sheet similar to Fig. 25, as a matter of preliminary practice; and, having done that, he should then evolve other designs on the same basis and plan as shown in Fig. 25 (*a*), (*b*), (*c*), and (*d*), but using the dots and checks in different positions on the background of squares.

2. On a Background of Diamonds: A sheet of paper should be ruled into diamond shapes, or tilted squares, as shown in Fig. 26, which may be done as follows: The $\frac{1}{8}$-inch divisions may be laid off, with a foot rule or yardstick, along the top, bottom, left edge, and right edge, as previously described for Fig. 25. First, a diagonal line may be drawn from the upper left to lower right edge, starting with the extreme upper left-hand corner and running down to some $\frac{1}{8}$-inch division point on the right-hand edge, the distance of this point from the bottom or top of the sheet being carefully noted. Next, a diagonal line may be drawn from the upper right corner and running down to the $\frac{1}{8}$-inch division point on the left-hand edge; that is, exactly the same distance above the lower edge of the sheet as is the lower end of the diagonal line just drawn. If lines are now drawn parallel to each of these two diagonals, and running through the $\frac{1}{8}$-inch divisions along the edges, diamond shapes will be formed, as shown in Fig. 26. These shapes may be varied by drawing the original diagonal lines at flatter or steeper angles; for instance, if the diagonals were drawn from the upper corners down to the 64th divisions on the sides, the

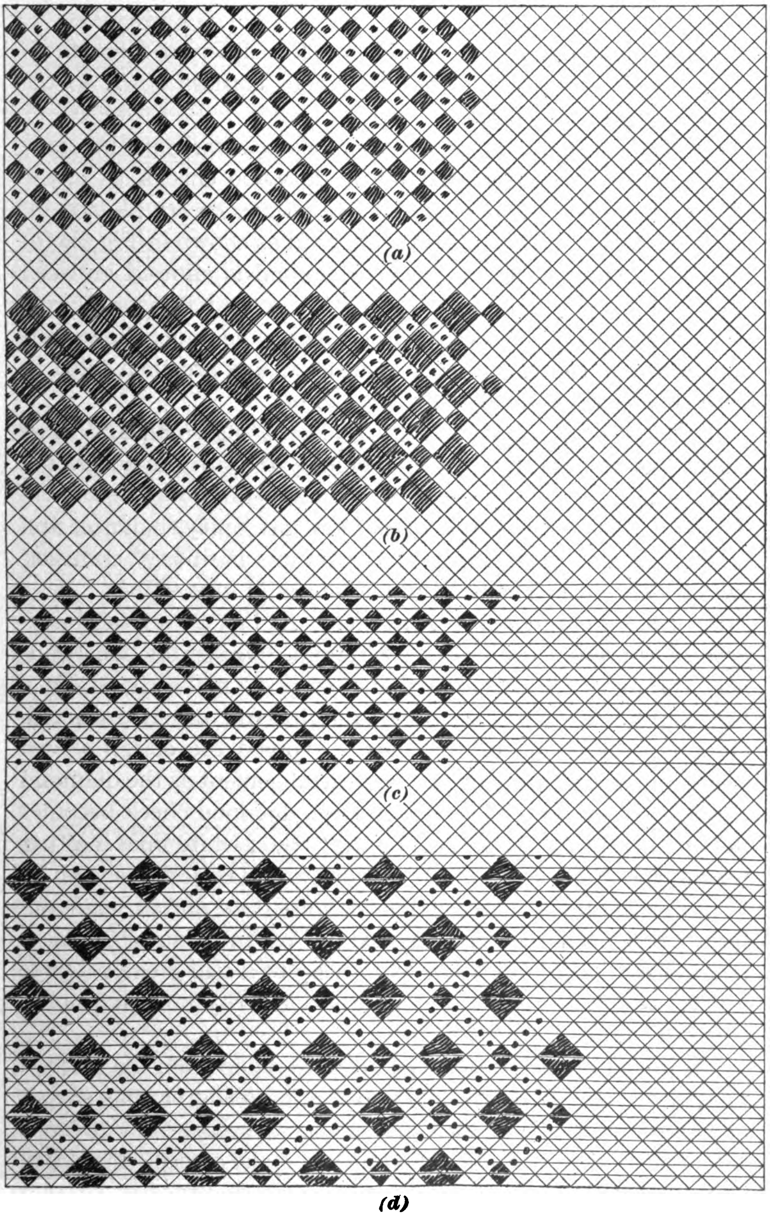


FIG. 26

resulting diamond shapes would be quite different from those made by drawing lines from the upper corners down to the 32d divisions on the sides.

On this background of diamond shapes designs may now be evolved by means of plotting in dots and checks, as in the case of Fig. 25. First, diamond-shaped checks are plotted in, as shown in Fig. 26 (*a*), after the method as shown in Fig. 25 (*b*) and (*c*). A space of one vacant diamond is allowed between each two checks horizontally. In the second horizontal row of diamond-shaped checks the large ones come under the vacant spaces of the top row. These vacant spaces are then filled in with smaller dots, as shown in Fig. 26 (*a*).

In Fig. 26 (*b*) the same plan of alternating small and large checks, as used in Fig. 25 (*d*), is employed, with the additional feature of filling in the vacant spaces with dots, as shown. Thus, in this design is portrayed not only unity, balance, and repetition, but also alternation, rhythm, harmony, contrast, variety, etc., which cause it to be unusually interesting.

3. On a Background of Triangles: In Fig. 26 (*c*) the background is altered somewhat by running horizontal lines midway through each diamond shape, so as to make therefrom a background of triangles, some upright and others inverted. On this background of triangles is evolved the design shown in (*c*), which is practically the same arrangement as the diamond checking in (*a*), except that each large diamond check becomes divided across the middle horizontally by a white line; in other words, the diamond is composed of two triangles as shown.

In Fig. 26 (*d*) is another arrangement of dots, and of small and large triangles, based, to some extent, on the plan of arrangement shown in (*b*), and thus expressing to a still greater degree unity, balance, repetition, alternation, rhythm, harmony, contrast, variety, etc.

These descriptions have been given to make plain the method of evolving designs from dots and checks, using various shapes as backgrounds. The student should therefore first lay out the work as shown in Fig. 26, and then make a sheet of original designs. In doing this it is allowable to use curved or circular dots or checks, as well as those having rectilinear sides.

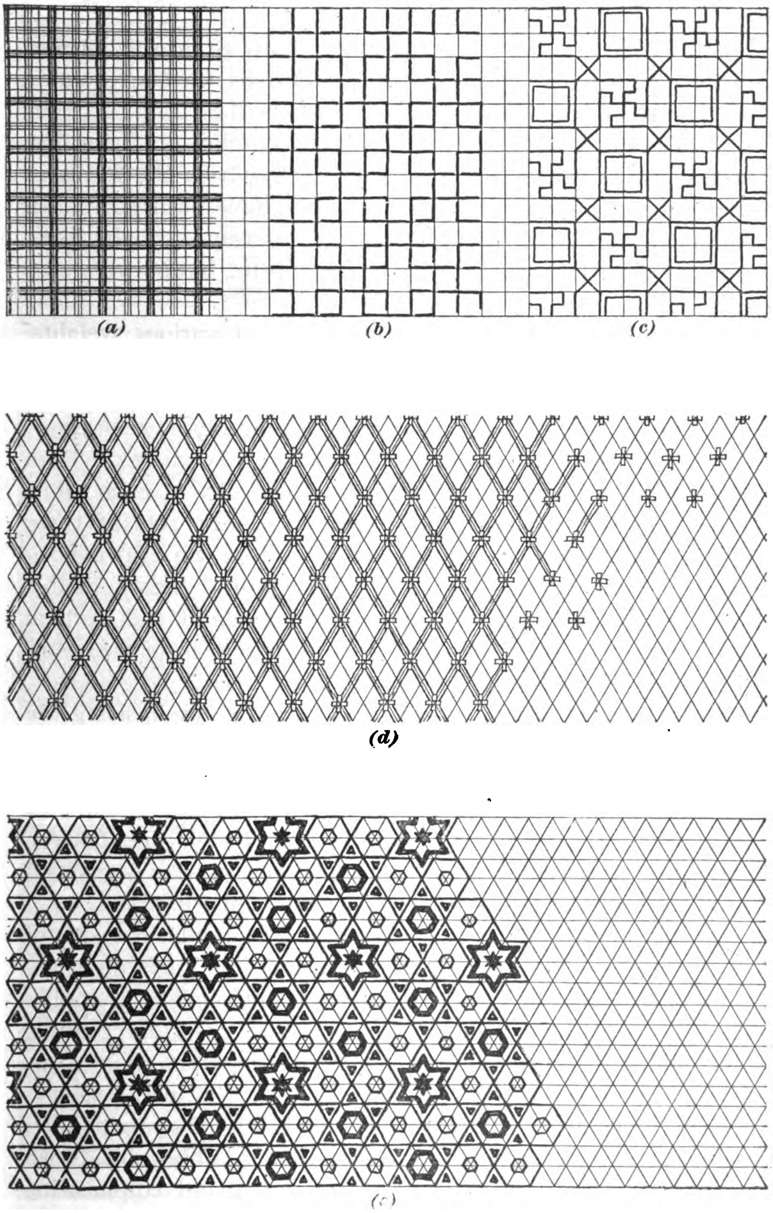


FIG. 27

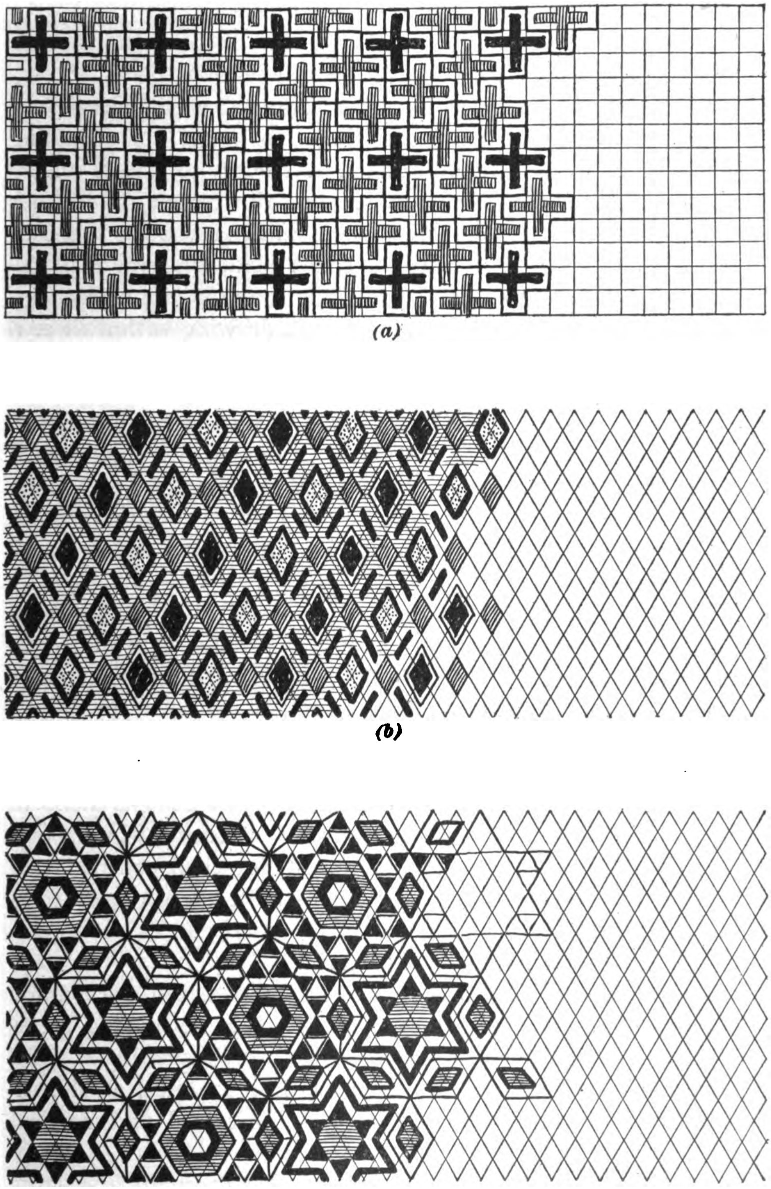
26. Outline Designs Evolved From Straight Lines. In these experiments in the evolving of designs, the backgrounds of squares, diamond shapes, and triangles will be used throughout. Designs evolved from dots, spots, checks, etc. have first been considered because these have always been the forms in which the beginnings of decorative work have been expressed. The next logical step is to evolve designs from straight lines, long or short, thin or heavy, black or gray, etc., but in every case simple straight lines.

In Fig. 27 (*a*), using horizontal lines of various weights, crossed at right angles by vertical lines of various weights, an interesting pattern is secured suggestive of a Scotch plaid. First, heavy double lines are drawn horizontally at each alternate horizontal line forming the network of squares. Then similar heavy double lines are drawn vertically at each alternate vertical line forming the squares. Next, sets of three very fine lines, grouped quite close together, are drawn horizontally and vertically midway between the heavy double lines first drawn; then, finally, single horizontal and vertical lines are drawn in the remaining white spaces, as shown, completing the Scotch-plaid pattern.

In Fig. 27 (*b*) fairly heavy lines are drawn, emphasizing the structural lines of the background network, and forming an interlace, as shown.

In Fig. 27 (*c*) the lines are drawn so as to form individual outlined squares, each alternate one containing a key or fret pattern as shown. It is readily seen that the designs that can be evolved by combinations of straight lines are practically limitless.

In Fig. 27 (*d*) straight lines are arranged on the network of lines forming the background of diamonds. Each alternate right oblique line, and each alternate left oblique line, is emphasized by grouping three fine lines in each case and running them along the selected line. At the points where the oblique sets of three intersect, the awkwardness of the intersection is relieved by placing a little cross, itself made of straight lines, over the intersection. Finally, single oblique lines are drawn through the remaining white spaces, upon and emphasizing the structural lines of the diamond shapes, with the result as



(a)

(b)

(c)

Fig. 28

shown. This apparently simple design, or pattern, is used for the very highest grade leaded-glass windows.

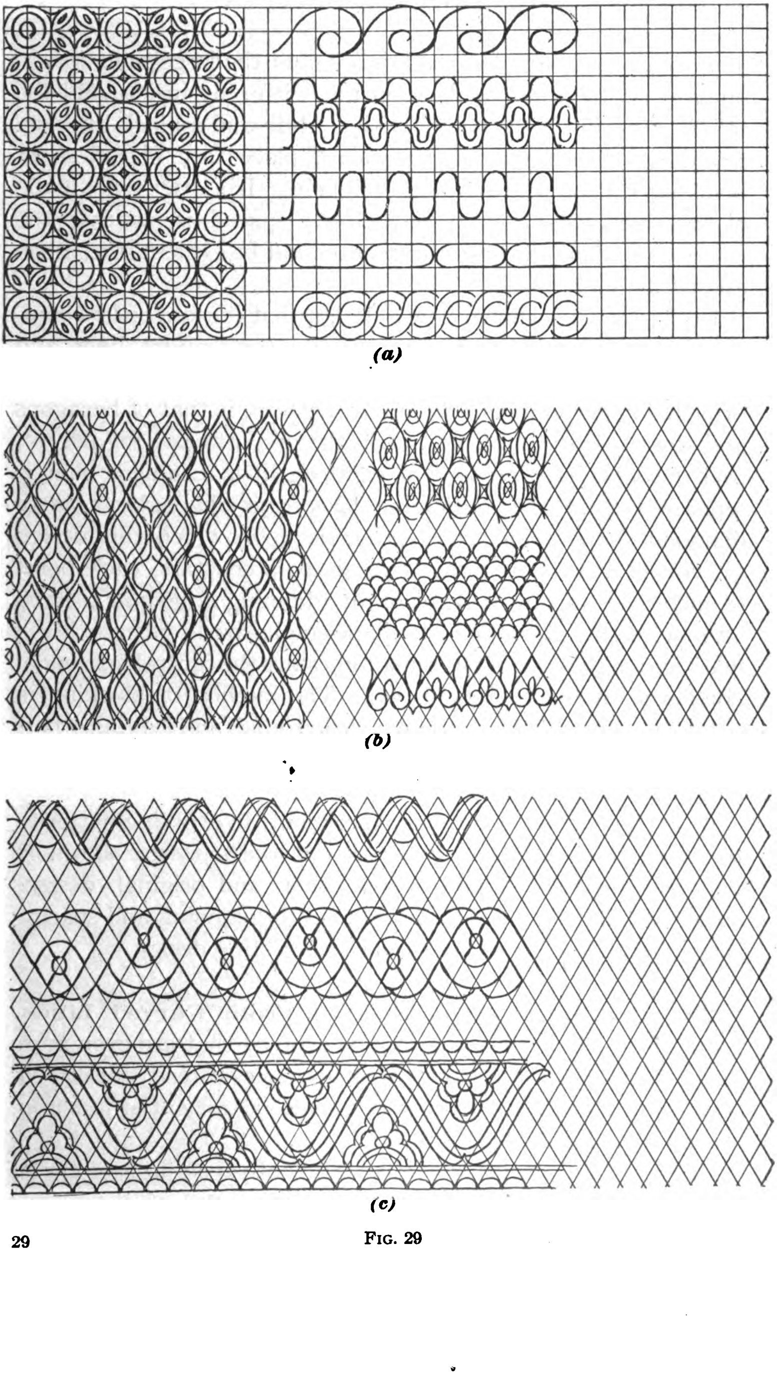
In Fig. 27 (*e*), straight lines are arranged on a background of triangle shapes. The principle is to group six adjoining triangles so as to form a hexagon. At every alternate one of its six corners, each hexagon touches the corner of another hexagon, the result being that when six hexagons get together and form a sort of large ring, the space inside this ring is in the form of a six-pointed star. This star shape is emphasized by making its limiting outlines heavy, and drawing within these a smaller star of heavy black lines with a smaller solid black star in the center. After drawing within each hexagon a smaller hexagon, in light lines, making a star shape with six lines within the heavily outlined star, and filling in the small triangles with other lines, the design is completed, as shown in (*e*). This pattern, while quite simple, will be considered very appropriate, artistic, and in every way practical for tiling, oilcloth, or linoleum.

The student should not only work out the design shown in Fig. 27, but should also evolve a set of original designs, based on squares, diamonds, and triangles, and consisting of straight lines, in outline work only.

27. Mass Designs Evolved From Straight Lines. However interesting may be the straight-line designs made in outline only, when the element of mass, black and white spots, is introduced, the interest is increased, for then contrast and variety are shown. Some experiments have already been tried in black and white masses, such as dots and checks on square, diamond, and triangular backgrounds.

In Fig. 28 (*a*) the square spaces are emphasized, very much as were the interlacings of Fig. 27 (*b*), thus forming a series of hollow crosses in outline, some of which should be filled with black crosses and the others with gray ones, as shown. The black crosses should be kept in horizontal and vertical rows, as shown, to secure the best effects.

In Fig. 28 (*b*) is shown an alternation of small and large diamonds, after the plan of arrangement evolved for Fig. 27 (*d*).



(a)

(b)

(c)

Fig. 29

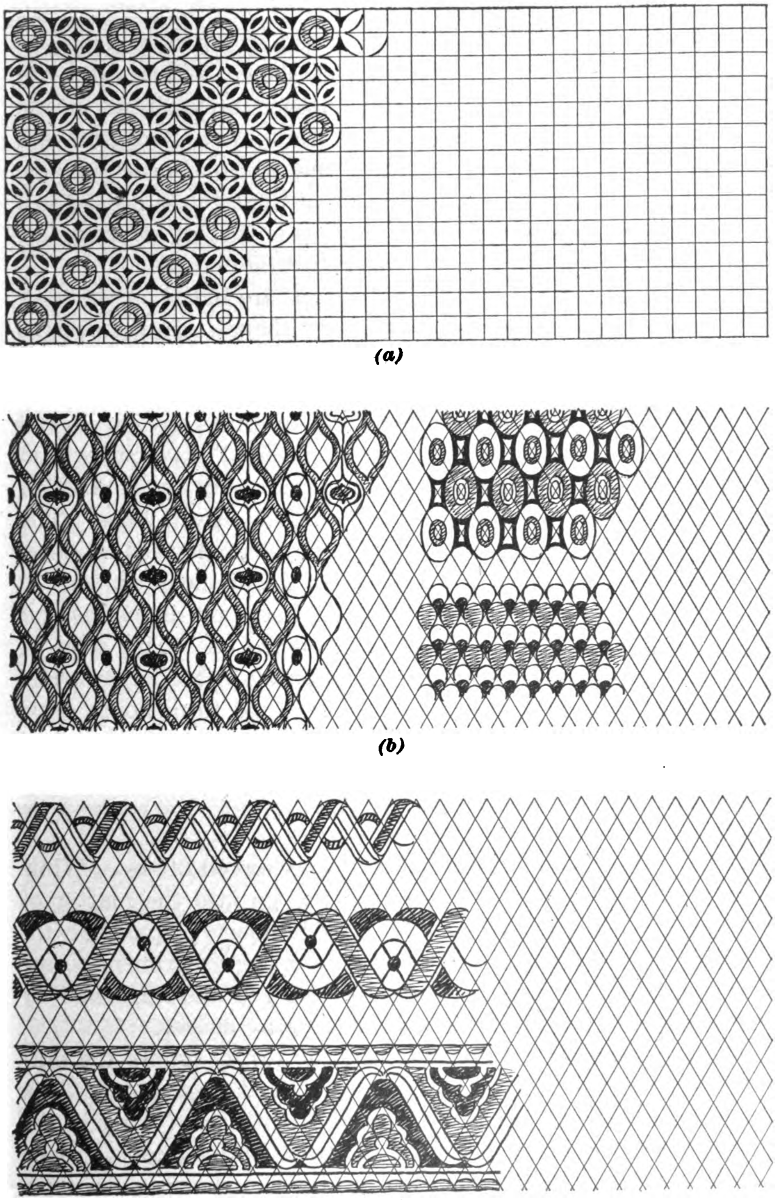
The small diamonds are made gray, and the large ones black, one set having a heavy black outline with gray inside, and the other set a solid black center with a white and a black line surrounding. In the remaining vacant places are placed short black strokes or bars running obliquely. If a gray tone, made of fine parallel horizontal lines closely spaced, is put over the entire ground, so that no white spaces will be evident, the interest will be increased.

In Fig. 28 (*c*) is shown how a design that is more or less complicated can be evolved quite readily by straight lines and rectilinear masses placed over a background of triangles. The principle underlying this design, or pattern, is that of hexagons and stars, as in Fig. 27 (*e*), but in the present case, Fig. 28 (*c*), each hexagon is composed of eighteen little triangles, and is separated from each adjoining large star shape by a large diamond shape. The basic principle upon which this design is evolved is first to form large six-pointed stars, each point of each one touching a point of an adjoining large star. Each alternate large star retains its shape emphasized by heavy black lines, and in the case of the remaining stars the central hexagonal portion is emphasized as shown. The method of blocking in certain portions of the remaining background, and leaving others untouched, is plainly shown in the illustration and need not be described in detail.

As in the case of the former experiments in evolving patterns, the student should actually work out the patterns shown in Fig. 28, and then should evolve other, and original, designs based on triangles. Considerable care in planning and spacing is required, in order to produce an interesting design.

28. Outline Designs Evolved From Curved Lines. From curved lines, designs may be evolved that are even more interesting than those from rectilinear ones already described, because the principles of growth, radiation, tangential junction, etc. are also illustrated.

In Fig. 29 (*a*), the design on the left is based on tangent circles occupying four adjacent squares, the diameter of each circle being the width of one square. When all these circles have been



(a)

(b)

(c)

Fig. 30

drawn, each alternate one is subdivided by smaller curves, so as to contain a four-pointed star, as shown. Each alternate circular shape is emphasized by another circle drawn inside the original one, and the points of the four-pointed stars are softened off, as shown. Other forms of curvilinear designs, making use of semicircles, are shown at the right in Fig. 29 (*a*). The principle underlying these designs is that of softening off the corners of the squares on which they are based.

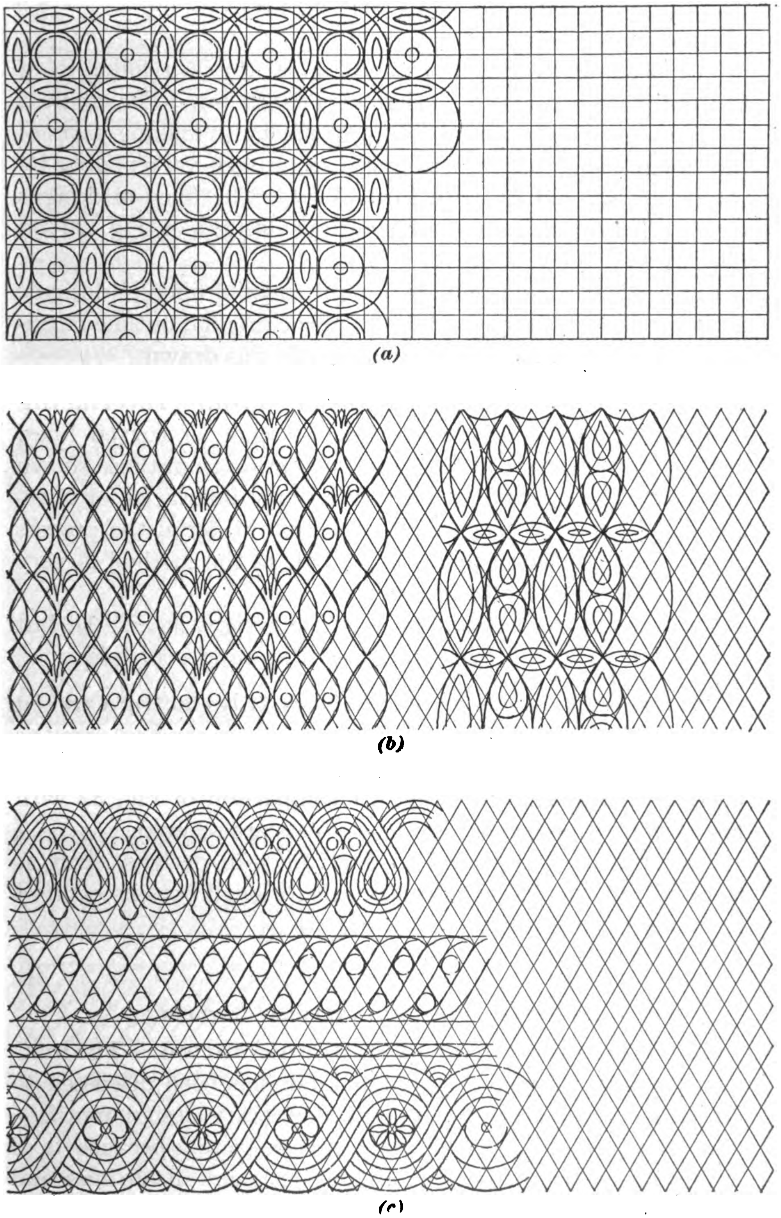
In Fig. 29 (*b*), the curvilinear designs are based on the plan of softening off the corners of diamond shapes. In the designs on the left, convex and concave curves are used alternately, emphasizing the sides of the large diamonds (each containing four small diamonds), making what are known as *ogee* curves and shapes. The main ogee shapes are emphasized by placing within them smaller ogee shapes, and the alternate ones are subdivided in several ways as shown, by subordinate curved lines. The other curvilinear designs, to the right in (*b*), are formed by other methods of softening off the corners of the diamond shapes.

In Fig. 29 (*c*), borders are evolved, based on diamonds and triangles, the points of which are softened off. This style of running border ornament is also called a *zigzag* border or stripe.

In this case, also, the student is expected to not only draw the designs as shown in Fig. 29, but also to evolve original designs with curved lines based on the square, the diamond, and the triangle.

29. Mass Designs Evolved From Curved Lines.—While it is not the intention, at this time, to go into the matter of **values** in design work, yet, as a preliminary preparation for the study of values, it will be an interesting experiment to see how the designs of Fig. 29 may be changed and improved by filling in parts of them with black and gray masses.

The black and white design, Fig. 30 (*a*), is simply the outline curvilinear design of Fig. 29 (*a*), filled in at parts. The centers of the main circles are filled in with gray; parts of the background; that is, of the four-pointed star shapes, are made solid black, and spots of black are used in the secondary circular shapes.



(a)

(b)

(c)

Fig. 31

The black-and-white design of Fig. 30 (*b*) is a filling-in of the outlined curvilinear design of Fig. 29 (*b*). The method of securing certain crisp and snappy effects by making parts of the design black and others gray can be seen very plainly by comparing Fig. 29 (*b*) with Fig. 30 (*b*). The filled-in designs in Fig. 30 (*c*) are simply the outline designs of Fig. 29 (*c*) filled in with tones of gray.

The student should prepare not only a set of filled-in designs, as shown in Fig. 30, but should fill in the original outline curvilinear sketches he prepared when Fig. 29 was drawn.

30. Outline Designs Evolved From Interlacing Curved Lines.—The outline designs, made of curved lines, in Fig. 31, differ very little in their evolution from those shown in Fig. 29, except that the curved lines are interlaced, or overlapping. It is not necessary to describe in detail the process of evolving the forms shown in Fig. 31, as the method is very clearly shown in the illustrations.

The student must draw not only the designs in Fig. 31, but must evolve original ones, based on the same principle.

31. Mass Designs Evolved From Interlacing Curved Lines.—The designs shown in Fig. 32 (*a*), (*b*), and (*c*), are the same as those of Fig. 31 (*a*), (*b*), and (*c*), except that they are filled in with black and gray. A comparison of Fig. 32 with Fig. 31 will show exactly how the effects are secured.

The student is expected to draw filled-in designs, such as those in Fig. 32, and also to fill in the original ones he evolved for his work in connection with Fig. 31.

DESIGNS FROM PLANT-FORM MOTIFS

32. Advanced Forms of Design Evolution.—The matter of evolving designs of various kinds has been discussed so far entirely from the standpoint of arbitrary design motifs—dots, straight lines, curved lines, masses, etc.—because it is with such arbitrary motifs that the designers in all ages and races began. It was only after these early designers became skilled in the use of arbitrary forms for the building up of their

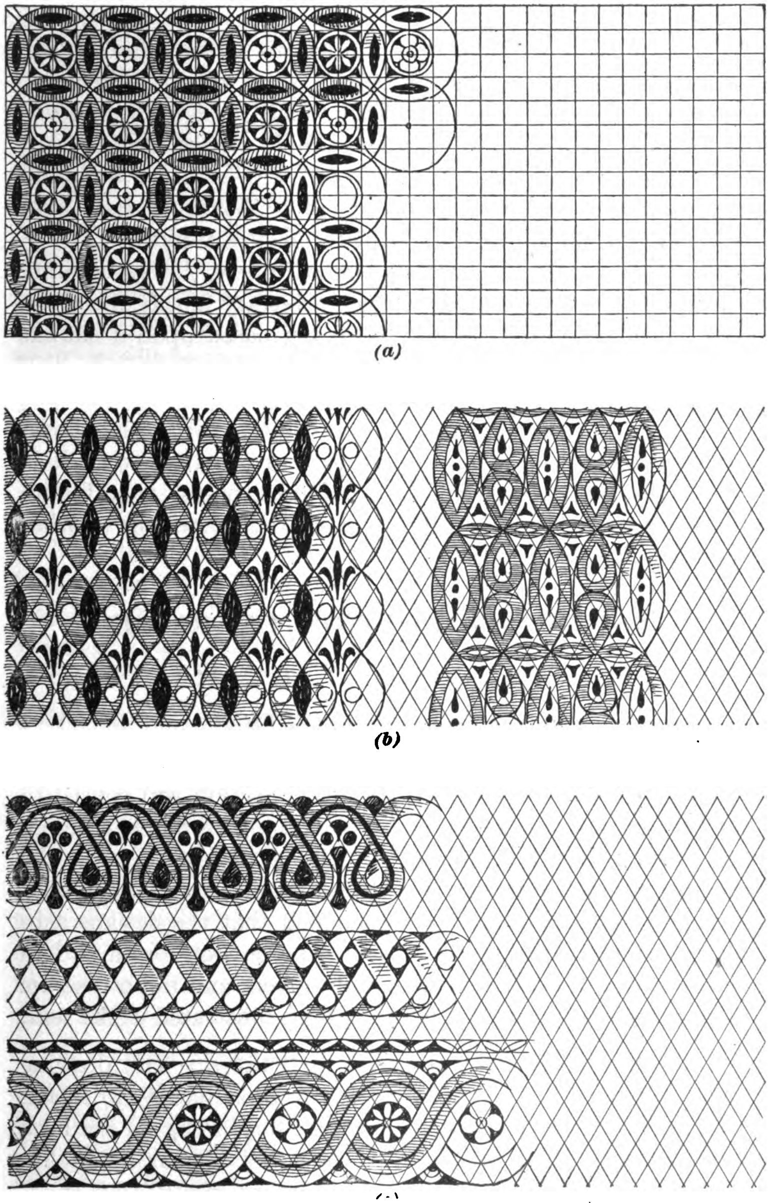


FIG. 32

decorative patterns that they turned to nature and appropriated, from her, motifs for design construction. However, having learned to build up, systematically, design foundations of dots and lines, it then became a simple matter to use plant-form motifs—stem, leaf, bud, flower, etc.—and to build up designs from these motifs, based upon the same rigid and systematic framework as was used for arbitrary motifs.

The beginner in design today must follow the same plan, learning first to evolve designs from arbitrary motifs and then, later, from plant-form motifs, all being based upon a similar systematic groundwork.

It is not necessary to discuss in detail or to illustrate, at this time, such design composition or evolution with plant-form motifs. When such designing is done in practical work it is referred to as all-over repeating patterns, or as space filling, which class of design building is treated in detail in another Section.

DESIGN-COMPOSITION EXERCISES

GENERAL INFORMATION

33. Required Work in This Section.—The work the student will do in connection with this Section will consist of the preparation of drawing plates containing exercises in design composition and the evolution of original designs, because the purpose here is to furnish actual practice in evolving or building up designs. It must be understood that the designs submitted on the drawing plates are to be entirely original, laid out in accordance with the directions given; and in no case are they to be copies from any of the designs illustrated in the text.

34. Character of the Drawing Plates.—The drawing plates will be four in number, each approximately 10 inches wide and 15 inches high, the exact size depending on the kind of paper used. The plates are to be subdivided horizontally; that is, across their 10-inch dimension, into three 10″×5″ rectangles. On Plates 2, 3, and 4 the top parts are to be ruled in $\frac{1}{8}$-inch or $\frac{1}{4}$-inch squares, the central parts in diamonds, and the lower parts in triangles, because these plates are to consist of experiments in evolving designs. The plates are to be sent to the Schools, one by one, for examination; and, while one plate is being examined and returned, the student will be working on the following one.

The designs on the plates may be boldly drawn with a fairly soft pencil, the ruled background lines being made of light lines with a hard sharp-pointed pencil. If it is found desirable to use pen and ink, or even brush work, instead of lead pencil work, it will be permissible. Whatever medium is used, the work should be executed with great care and accuracy.

PLATE 1

35. Exercise A, Plate 1.—In the upper 10″×5″ rectangle of the plate arranged vertically, make careful drawings or designs to illustrate the principles of *unity* and *balance*. The principles may be portrayed in separate drawings or both in the same drawing. Figs. 7 and 8 should be referred to, but must not be copied; the designs for this exercise must be original.

36. Exercise B, Plate 1.—In the middle 10″×5″ rectangle make drawings or designs to illustrate the principles of *rhythm* and *harmony*. There may be two separate drawings or one drawing, as preferred. Figs. 9 to 16 should be referred to, but must not be copied; the designs for this exercise must be original.

37. Exercise C, Plate 1.—In the lower 10″×5″ rectangle make drawings or designs to illustrate the principles of *repetition*, *contrast*, and *variety;* in separate drawings or in one drawing, as preferred. Figs. 17, 18, 19, and 20 should be referred to, but must not be copied; the designs for this exercise must be original.

38. Final Work on Plate 1.—Letter or write the title, Plate 1: Design Composition, at the top of the sheet, and on the back place class letters and number, name, address, and date of completing the plate. Roll the plate, place in the mailing tube, and send to the Schools for examination. Then proceed with Plate 2.

PLATE 2

39. Exercise A, Plate 2.—In the upper 10″×5″ rectangle evolve an original design, consisting of dots or checks, based on a background of ruled squares. Refer to, but do not copy, Fig. 25, and read carefully the accompanying text.

40. Exercise B, Plate 2.—In the middle 10″×5″ rectangle evolve an original design, consisting of dots or diamond checks, based on a background of ruled diamond shapes. Refer to, but do not copy, Fig. 26, and read carefully the accompanying text.

41. Exercise C, Plate 2.—In the lower 10″×5″ rectangle evolve an original design, consisting of dots or triangular checks, based on a background of ruled triangular shapes. Refer to, but do not copy, Fig. 26 (*c*) and (*d*), and read carefully the accompanying text.

42. Final Work on Plate 2.—Letter or write the title, Plate 2: Design Composition, at the top of the sheet, and on the back place class letters and number, name, address, and the date of completing the plate. Roll the plate, place in the mailing tube, and send to the Schools for examination. If all required redrawn exercises, or new designs, for Plate 1 have been finished, proceed with Plate 3.

PLATE 3

43. Exercise A, Plate 3.—In the upper 10″×5″ rectangle evolve an original design, consisting of straight lines based on a background of ruled squares. At the left-hand side of the rectangle show the straight-line design *in outline* only, referring to, but not copying, Fig. 27 (*b*). At the right-hand side of the rectangle show the straight-line design in *mass*, referring to, but not copying, Fig. 28 (*a*). In each case, read carefully again the accompanying text.

44. Exercise B, Plate 3.—In the middle 10″×5″ rectangle evolve an original design, consisting of straight lines, based on a background of ruled diamond shapes. At the left-hand side of the rectangle show the straight-line design in outline only, referring to, but not copying, Fig. 27 (*d*). At the right-hand side of the rectangle show the straight-line design in mass, referring to, but not copying, Fig. 28 (*b*). In each case read carefully again the accompanying text.

45. **Exercise C, Plate 3.**—In the lower 10″×5″ rectangle evolve an original design, consisting of straight lines, based on a background of ruled triangular shapes. At the left-hand side of the rectangle show the line design in outline only, referring to, but not copying, Fig. 27 (*c*). At the right-hand side of the rectangle show the line design in mass, referring to, but not copying, Fig. 28 (*c*). In each case read carefully again the accompanying text.

46. **Final Work on Plate 3.**—Letter or write the title, Plate 3: Design Composition, at the top of the sheet, and on the back place class letters and number, name, address, and the date of completing the plate. Roll the plate, place in the mailing tube, and send to the Schools for examination. If all required redrawn exercises, or new designs, for previous plates have been finished, proceed with Plate 4.

PLATE 4

47. **Exercise A, Plate 4.**—In the upper 10″×5″ rectangle, evolve an original design, consisting of curved lines, based on a background of ruled squares. At the left-hand side of the rectangle show the curved-line-design in outline only, referring to, but not copying, Fig. 29 (*a*) and Fig. 31 (*a*). At the right-hand side of the rectangle show the curved-line design in mass, referring to, but not copying, Fig. 30 (*a*) and Fig. 32 (*a*). In each case read carefully again the accompanying text.

48. **Exercise B, Plate 4.**—In the middle 10″×5″ rectangle, evolve an original design, consisting of curved lines, based on a background of ruled diamond shapes. At the left-hand side of the rectangle show the curved-line design in outline only, referring to, but not copying, Fig. 29 (*b*) and Fig. 31 (*b*).

At the right-hand side of the rectangle show the curved-line design in mass, referring to, but not copying, Fig. 30 (*b*) and Fig. 32 (*b*). In each case read carefully again the accompanying text.

49. Exercise C, Plate 4.—In the lower 10″×5″ rectangle evolve an original design, consisting of curved lines, based on a background of ruled triangular shapes. At the left-hand side of the rectangle show the curved-line design in outline only, referring to, but not copying, Fig. 29 (*c*) and Fig. 31 (*c*). At the right-hand side of the rectangle show the curved-line design in mass, referring to, but not copying, Fig. 30 (*c*) and Fig. 32 (*c*). In each case read carefully again the accompanying text.

50. Final Work on Plate 4.—Letter or write the title, Plate 4: Design Composition, at the top of the sheet, and on the back place class letters and number, name, address, and the date of completing the plate. Roll the plate, place in the mailing tube, and send to the Schools for examination.

If any redrawn work on any of the plates of this Section has been called for and has not yet been completed, it should be satisfactorily finished at this time. After all the required work on the plates of this Section has been completed, the work of the next Section should be taken up at once.

SPACE FILLING

PURPOSE

1. Third Stage in Learning to Design.—It is not enough that the designer should understand design motifs and the principles of design composition and have practice in evolving design patterns. In practical work, the surface, fabric, object, or allotted space thereon, will have definite limits, in many cases, that must be filled appropriately with decoration, or that may demand an all-over repeating design, whether for a surface or a solid; and the designer must know how to adapt his design to such requirements.

The purpose of this Section is to furnish a training in such space filling, applying the training that has already been given in devising design motifs and in getting up design compositions. This training may be considered the third stage in learning to design.

2. Classification of Spaces to Be Filled.—The various spaces that the designer will be required to fill with decoration follow the same classification as that of geometric figures; namely, those of *one dimension*, those of *two dimensions*, and those of *three dimensions*. Of course, not many designs can very well be of one dimension only; although a single line may be made sufficiently decorative to be a design. But designs may be of two dimensions, length and breadth, or height and width. Such two-dimensioned designs are known as surface designs, or surface patterns, and may again be subdivided into designs of limited area, such as those included in geometric figures of various kinds; those of unlimited area in one direction, such as

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borders, bands, stripes, etc.; and designs of unlimited area in all directions, such as all-over repeating patterns for textiles, wallpapers, carpets, etc. Again, designs may be of three dimensions, in which case their extent passes beyond the limits of length and breadth and includes also thickness. In other words, designs of three dimensions are those made for solids that are to be beautiful as well as useful, such as articles in metal, silverware, jewelry, furniture, etc. In the case of designing for solids, the same principles of design composition apply as in the case of designing for surfaces.

3. **Character of Design Motifs Used.**—In illustrating the methods of space filling, and in giving training in designing for surfaces and solids, the arbitrary motifs, dots, lines, squares, etc., and the plant-form motifs, conventionalized stems, leaves, flowers, etc., will be used interchangeably and in the manner that seems most appropriate in each case.

DESIGNING FOR SURFACES

LIMITED AREAS

DISTRIBUTION OF LINES

4. **Position of Lines Influenced by Shape of Area.** Any design that is to be applied to a limited area or surface must unquestionably possess the quality of fitness for the purpose intended and for the shape of the area. That the decoration or design should exactly fit the available shape is just as important as that the fabric or article should exactly fit the purpose for which it is made. Mere application of decorative details, sometimes called ornament, to a given space is neither decoration nor applied design. In any respect in which the design falls short of perfect adaptation to the space for which it is intended, in just that respect does it fall short of being proper design.

5. In Fig. 1 are shown four shapes or areas of limited extent, and a very little study will determine that no two of them could be rationally treated from a decorative standpoint in exactly the same way. In making designs for these shapes, the first consideration must be the direction in which the lines of the design should run to suit the surface shape.

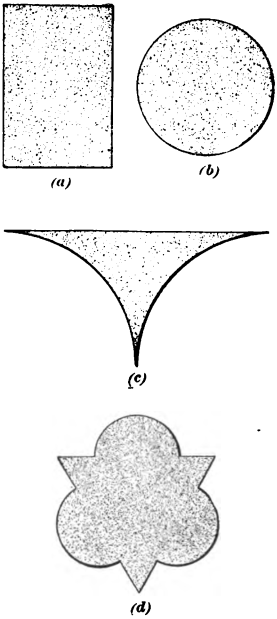


FIG. 1

The lines forming the boundaries of the shape should influence the direction of the main lines of the design. The leading lines of the design should emphasize the lines of the boundaries; but if for any reason this cannot be done, the minor lines should be made to do so. This must all be done with perfect harmony and due care to prevent monotony. The principles of contrast and variety should be carefully observed.

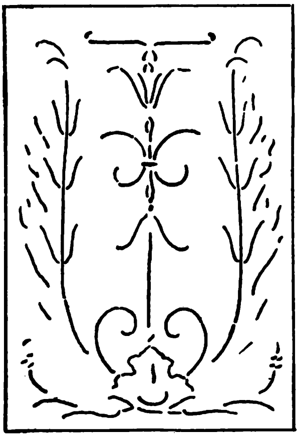


FIG. 2

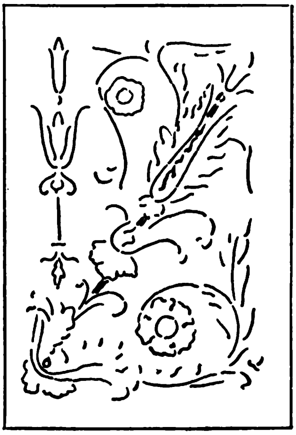


FIG. 3

6. **Emphasis of Structural Lines.**—In Fig. 2 there is shown the decoration of a surface similar to that illustrated in Fig. 1 (*a*). The first lines put in place here are the vertical ones repeating and emphasizing the effect of the sides of the rectangle, but varying in length. Short horizontal lines are then introduced, emphasizing the top and the bottom of the rectangle; then the curved lines are brought in for contrast.

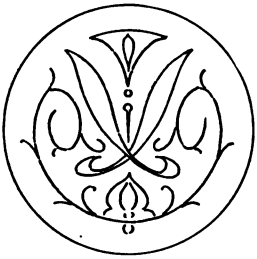


FIG. 4

Fig. 3 illustrates the principle of making the minor lines emphasize the boundaries. Here the start is made with a diagonal line, in direct contrast to any of the sides of the rectangle. This contrast is made strong, and variety is obtained by the introduction of the spiral lines; then the short vertical and horizontal lines are introduced as secondary details, to emphasize the sides of the rectangle.

7. **Emphasis of Curved Lines.**—In Fig. 4 the structural shape is the circle, based on the shape shown in Fig. 1 (*b*), and the same details apply here as in the previous case. A central vertical line stands in strong contrast to a boundary line, while the curved lines are in harmony with it and emphasize the circumference.

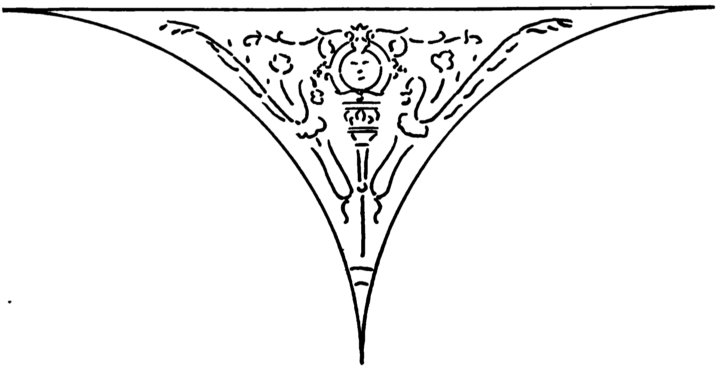


FIG. 5

In Fig. 5 the shape to be decorated is triangular, with the lower two sides curved, and is based on the shape shown in Fig. 1 (*c*). This shape is called a *spandrel* and goes between two arches, and is an important feature of such construction. The curved lines forming its boundaries are given more emphasis, while the vertical line separating them is introduced to present contrasts.

In Fig. 6, which is based on Fig. 1 (*d*), the volute forms and the semicircle within the top emphasize the outline of the figure, while both contrast and variety are produced by the flowing lines from the center to the sides.

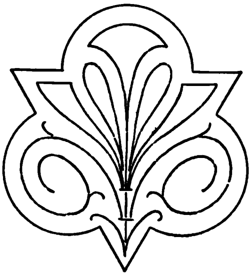


FIG. 6

8. **Placing of Secondary Lines.**—While some of the lines used in laying out decoration are in accord with the boundaries of the surface, the secondary lines must also be influenced in their direction by the main lines, as shown in Fig. 2, where the small lines branching from the center to the verticals are influenced by the curves in the verticals themselves.

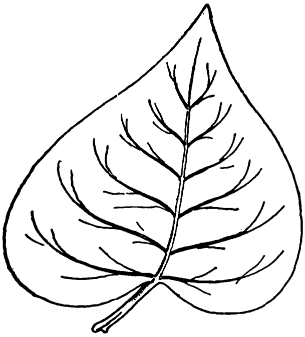


FIG. 7

This principle of harmony and fitness in the direction of lines can readily be studied by the observation of the veining of some leaves. For instance, in the lilac leaf shown in Fig. 7, although in the beginning of their growth the veins start almost in direct contrast to the direction of the edge of the leaf, they gradually assume a curve similar to the marginal outline, and the secondary veins are in harmony with the primary ones.

In order to further secure this harmony and unity in composition, lines should express a continuity in their arrangement as well as a harmony with each other and their surrounding outlines, and, although they may be interrupted, a common and united direction should be indicated.

9. Continuity of Lines.—All lines should express the feeling that if they were continued in the same direction or on the same curve from the point where they stop, they would unite with some other line. Thus, in Fig. 8 is shown a design to fill a square panel, which is laid out on a symmetrical arrangement, and the scroll lines *a* and *b* possess such curves as would bring them into unity with other curved lines if continued, as shown by the dotted lines.

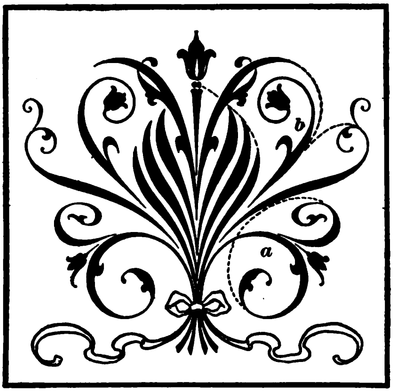


FIG. 8

DISTRIBUTION OF MASSES

10. Influence of Nature.—Another point to be observed is the proper distribution of the masses between the lines, so that they will bear a pleasing mutual relation. This can be studied from natural leaf forms. For instance, the even distribution of spaces may be observed in the ivy leaf shown in Fig. 9. Although the veins do not equally divide the surface, they separate it into varying quantities so nicely graduated and balanced that there is an evenness and uniformity of arrangement.

This distribution of masses is materially affected when the design is being finished and the lines of the original decoration are being converted into flowing leaf forms and general details, proportioning the spaces to the surface on which they are applied.

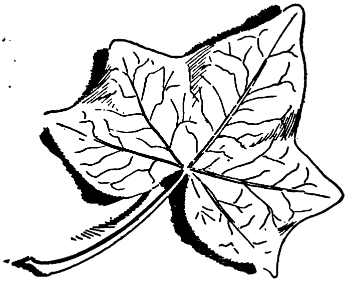
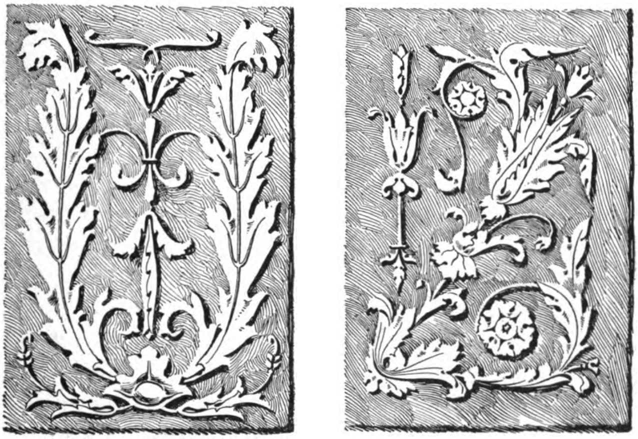


FIG. 9

11. Mass Decoration Based on Line Direction.—The general outline form shown in Fig. 2 suggests the distribution of lines desired for the decoration of this rectangular surface, and the propriety and character of this distribution are expressed much more clearly when the design is finished in masses upon these lines, as it is in Fig. 10 (*a*). Here the aim has been to preserve an even and restful balance between the background and the decoration, securing a distribution of masses that would be materially influenced by any change in the direction of the originally sketched lines in Fig. 2.



(a) *(b)*

Fig. 10

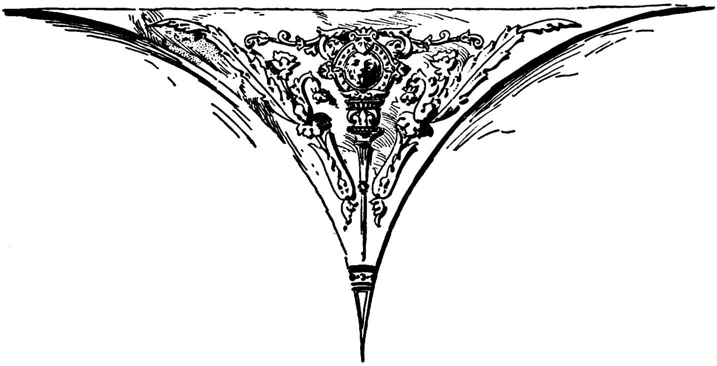


Fig. 11

The sketch in Fig. 3, showing another principle in effecting the contrast of lines to secure a characteristic decoration in a rectangular panel, when elaborated to the completed mass form in Fig. 10 (*b*), illustrates clearly the value of properly conceiving this distribution of guide lines in order that the finished design may be carried out without material alteration of the original idea.

Fig. 11 shows the completed design for the spandrel of the arch, the outlines of which were drawn in Fig. 5.

The value of practice in this direction cannot be too highly estimated, as it is of particular importance in connection with surface designs, whether the surface be a wall, a floor, the side of a building, or a portion of the details of some interior decoration.

USE OF CONVENTIONALIZED PLANT-FORM MOTIFS

12. Conventionalizing to Suit the Space.—When the principles of filling limited areas have been learned by means of experiments with design motifs more or less arbitrary, the student is ready to use plant-form design motifs in such areas. The first consideration when using plant-form motifs must concern the character and form of the outlines and structural lines of the space to be filled. For practice work it is wise to make repeated conventionalized forms of the same flower, basing them on some definite geometrical shape that the design is to fill, such as an equilateral triangle, a lozenge shape composed of two equilateral triangles, a square, or a rectangle, each of which is frequently used in designs as a basis on which the repeat is arranged.

In filling these spaces, the designer must possess inventive genius; he must be original, independent, and daring, and he must be a close student of nature in order to be successful. A designer, though possessing aptitude for designing, if he lacks a thorough knowledge of nature, can hope to produce nothing more than an incongruous and irrational design; on the other hand, if he is well acquainted with the details of nature, and is sufficiently daring and independent to depart from nature for good decorative reasons, he is almost certain to be successful, from both the artistic and the practical standpoints. In case a particularly difficult form must be adapted to fill a given space, it must be bent or twisted or curtailed until it fits. The weak designer declines to bend the stem, leaf, or whatever floral motif he is using, because it does not bend in nature, or he declines to curtail it because it is natural that it should be extended, and the result is that excellence of decoration is sacrificed on account of his timidity and the design becomes weak and lacking in decorative expression.

As giving some idea of the degree to which the designer may depart from portraiture of nature when he enters into purely conventional treatment, it may be said that so long as his drawings do not overstep the bounds of good design and enter the realm of absurd and incongruous decoration, his fancy for the decorative element may be as extreme as he chooses. Therefore, his imagination should be given free rein, and he should borrow his elements for their beauty, and distort them, if necessary, to suit them to his purpose, so long as he does not produce absurdities. The common swamp flag or the cattail, for instance, grows perpendicularly; it is never seen curved gracefully in nature, and its only departure from the vertical is where the reed or leaf becomes broken. But if this type of natural growth is desired as a decorative element to fit a certain space, the designer can bend the cattail, or curve its leaves gracefully, or arrange them as though unrelated to the ogee curve, so long as they suit the purpose and space for which they are intended. But to have them growing horizontally from the sides of the surface or diagonally out of the corners, or from the top downwards, would be to overstep the bounds of conventionalism and therefore would be an absurdity.

13. Practical Hints for Using Plant Forms.—The designer should first have a general idea as to how his design is to look when finished. His mental picture of it may not be complete in every detail, but the main features can be forecasted before he attempts to place it on paper. He should see the form as a whole, and roughly sketch it symmetrically on both sides of a vertical line representing the center line of

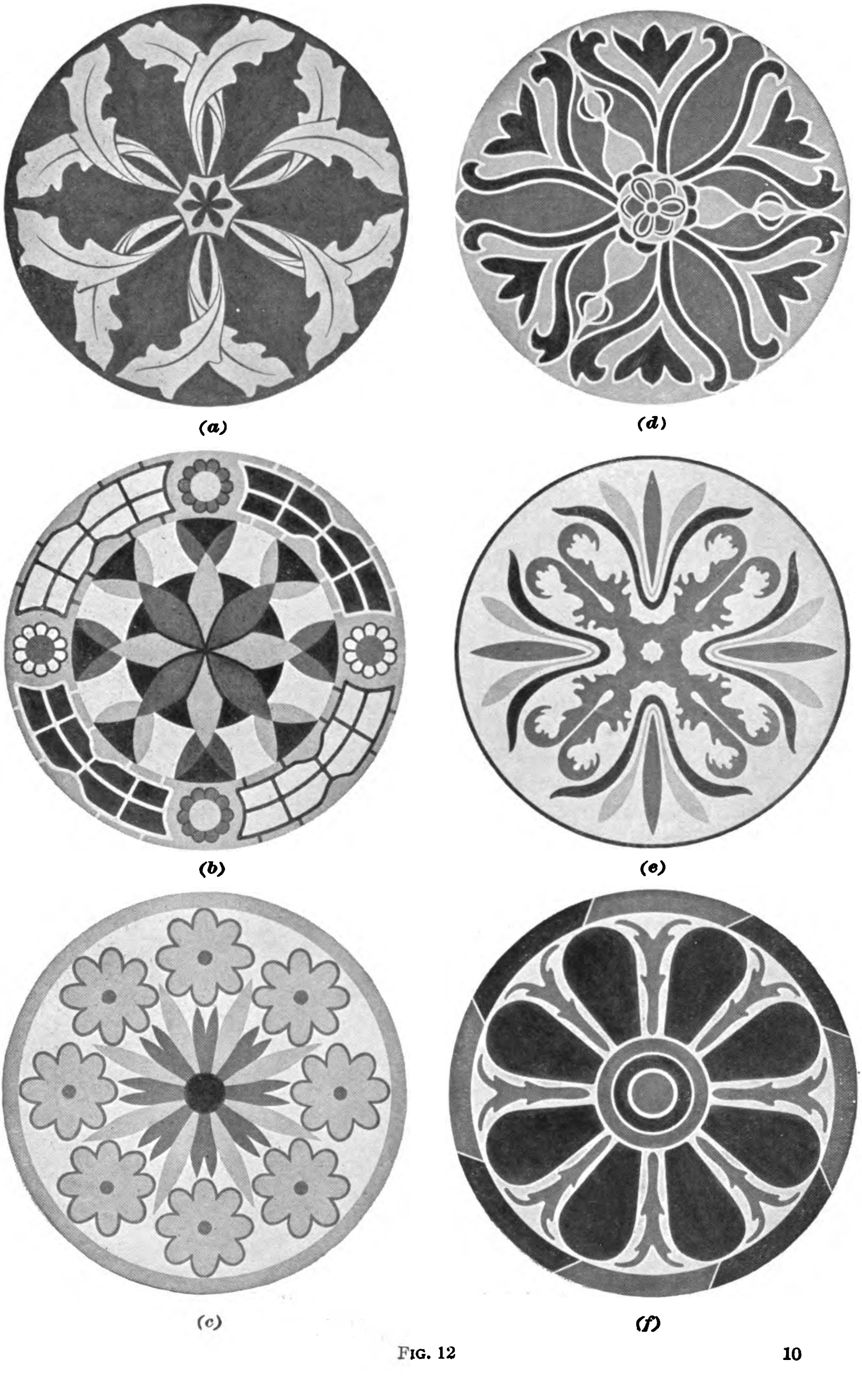


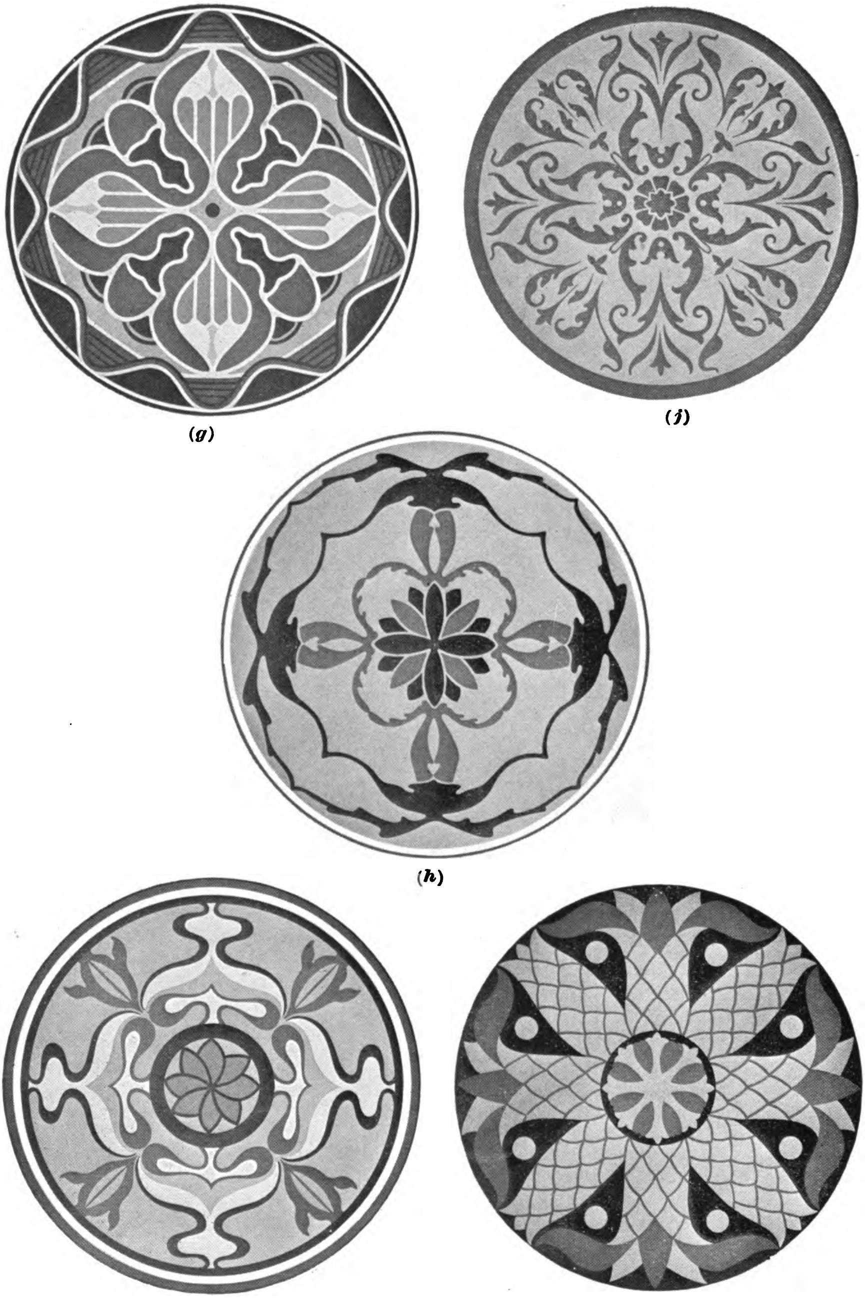
FIG. 12

the space to be filled. With the main lines in place, he may work up the details somewhat, and when thoroughly satisfied with the sketch he should draw the structural lines, and the decorative details upon them, very carefully on the left side of the vertical line, after which the roughed-in sketch on the right side of the line may be erased.

A piece of tracing paper is then laid over the left side of the figure, a vertical line drawn down the center, and the whole carefully traced by means of a finely pointed soft-lead pencil. The paper should then be turned over and the lead lines transmitted to the right side of the figure either by gently rubbing on the back of the paper with the forefinger nail or by placing another piece of tracing paper over the back of the first one and rubbing over this with a 4H or 6H pencil. The right side can then be penciled in carefully and the whole drawing cleaned up and finished. With more skill in drawing, both sides may be drawn freehand, and the balance secured by means of eye measurement or scaling by compasses. The tracing method is the practical one because it is quicker, as a rule, but it should not be resorted to on all occasions, as it is good practice to duplicate two sides of the drawing entirely freehand. In practical commercial work, however, absolutely accurate symmetry is required, and the tracing process is therefore employed.

In studying the effect of symmetry, a small strip of mirror or looking glass is useful. When held perpendicular to the drawing board with the lower edge placed along the center line or the edge of the design so that the design is reflected in the mirror, it will enable the designer to study the effect of two sides of the design when completed. Two such strips of mirror, whose long edges come together in an **L** shape, can be laid at the edge of a design, or a portion of a design, and a continuous circular design repeat obtained so as to convert any articles or series of articles into a decorative rosette.

When the figure is carefully outlined it should be washed in with black and white or color, the best results being obtained by the beginner, however, by simply using several shades of gray.



(g) (j)

(h)

(i) (k)

FIG. 13

14. Examples of Plant-Form Motifs in Limited Areas.—In Figs. 12 and 13 are shown eleven arrangements of plant-form motifs for geometrically shaped limited areas—in this case circles. A close inspection of each design will reveal just what floral forms were used, how they were conventionalized, and upon what basis they were combined and arranged in the circular forms. While the student is not supposed to duplicate these examples, they will be helpful in suggesting to him the framework upon which arrangements may be made for designs based on plant-form motifs.

Similar conventionalizations and arrangements can be applied to other geometrical shapes and limited areas, such as squares, rectangles, diamond shapes, triangles, etc.

BORDERS AND CORNERS

15. Various Types of Borders.—In the present consideration the designing of borders will be treated only from the standpoint of their evolution as designs. Their practical application—that is, whether they are to serve as friezes for wallpapers, borders for hardwood and mosaic floors, or other utilitarian purpose—will be taken up at a later stage of the Course.

16. There are four distinctively different ways in which a frieze may be treated. It may contain a continuous running pattern as shown in Fig. 14 (*a*), a system of treatment observable in many carved friezes, but, unfortunately, productive of rather a weak effect when used for plain surface decoration.

A better method is by the introduction of a number of vertical elements as illustrated in (*b*), somewhat after the classic method of frieze decoration as shown in Fig. 15, which is a portion of a frieze from an old temple in Greece. Several separate details of this character may be joined by horizontal running motifs as shown in Fig. 14 (*c*), which may be considered somewhat more in sympathy with the system of treating this detail, as shown in Fig. 16.

The fourth method, shown in Fig. 14 (*d*), is by the introduction of a number of panels, but this is only applicable where a severe

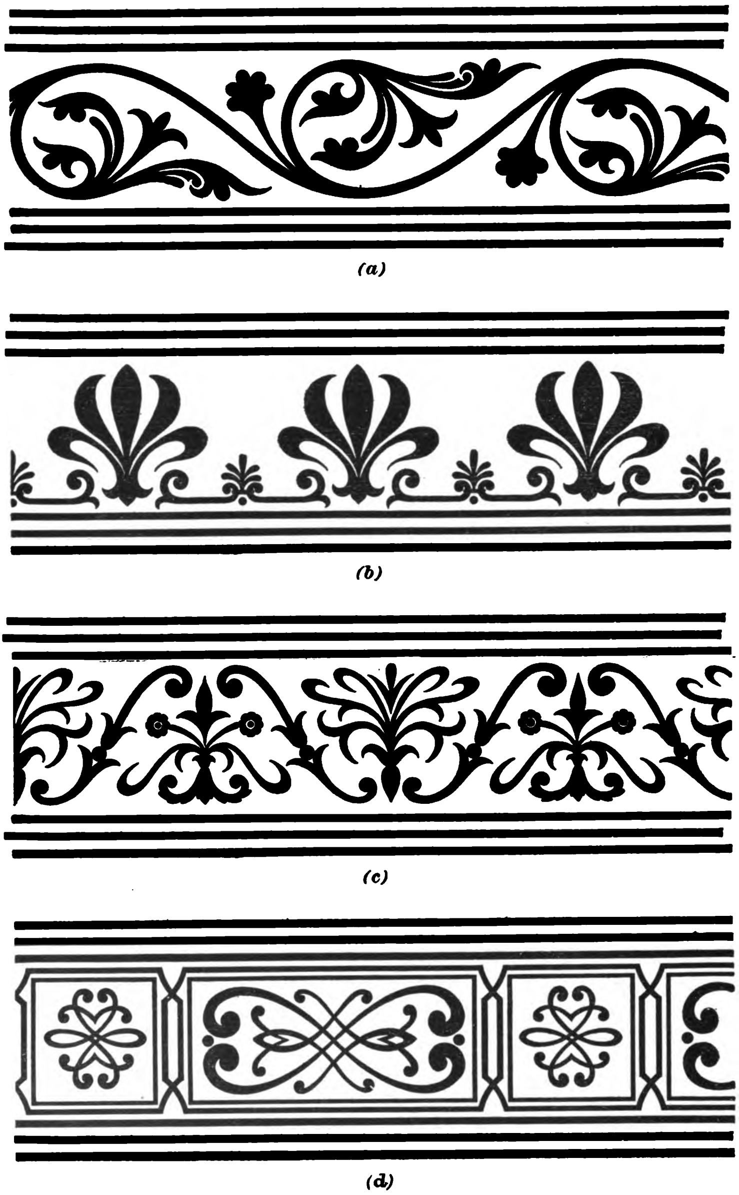


FIG. 14

form of treatment is desired. The system of filling a frieze with a few vertical elements is entirely in accord with the structural conditions.

Whether the frieze is laid out by an arrangement of panels or by simple vertical elements, it is always wise to accentuate the structural lines, but the extent to which this is permissible depends on the general scheme adopted. If the scheme of design is severe and dignified, structural accentuation may be carried out to a greater degree than if the treatment be light and fanciful.

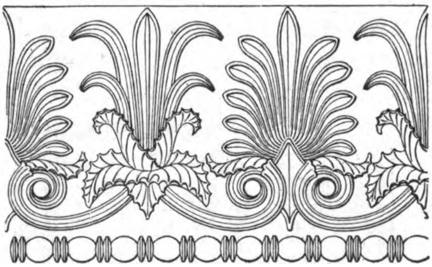


Fig. 15

17. Purpose of Borders.—The primary office of borders in design is usually to prevent the decoration of one surface from lapping over and impinging on that of another; therefore, an elaborate border of complicated design requires a separating element of a plainer character in order to keep its design from mingling with that of the filling and thereby forming a part of the patterns it is intended to separate. This is sometimes accomplished by making a distinct contrast between the character of the pattern of the border and that of the filling. This contrast may be in the arrangement of lines, by allowing vertical lines to predominate one and horizontal lines to form the characteristics of the other, or in mass, or in color.

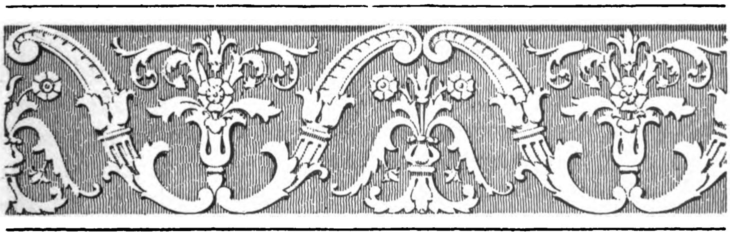


Fig. 16

Another purpose of the border is that of the enclosing of an ornament in order to confine it and give it an expression of unity. In the case of a picture, the application of a border in the form of a frame is to separate it from the more conventional character of the wall surface on which it hangs and to confine the attention to that which is enclosed within the frame.

18. The treatment of the border depends entirely on the space around it, and the character of the design must be carefully studied in order that the border may not be of more interest than that which it encloses. When the subject does not allow of a proper border, a simple line around the edge to confine it to its apparently allotted space is sometimes sufficient to satisfy the eye; but this method should be sparingly used and only when some good reason warrants its adoption.

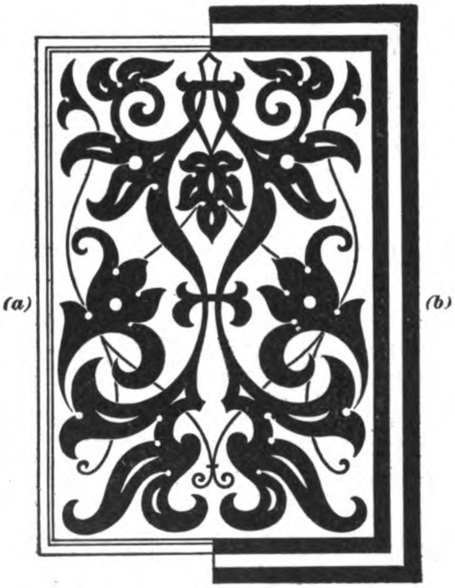


Fig. 17

The character of the border, as said before, must be studied relatively to the design surrounded; for instance, in Fig. 17 is shown a panel of conventional design where at (*a*) the simple line border is readily seen to be insufficient, while at (*b*) a heavier border is introduced and suits its purpose better. There is no rule that requires the design of a border to be simply a band around its subject demanding parallel lines, and in Fig. 18 is shown a design where the inside of the border is not parallel with the outside, but consists of a surrounding member of special design to suit its particular purpose.

In Fig. 19 (*a*) the upper half of the panel of foliated ornament is surrounded by a border composed of details, the interest of which is too great and consequently conflicts with the interest in the panel itself; but in (*b*) the same foliated ornament in the border for the lower half of the panel is reduced to a conventional rendering, thereby suiting its purpose exactly and enhancing the value of the design instead of detracting from it.

19. Pilasters.—Besides horizontal borders, there are vertical elements that fulfil the same functions; and under this consideration may be included the decorative elements of pilasters and other upright divisions of a wall surface.

Many lines used for horizontal borders have often been adapted to the decoration of pilasters; but this course is not to be commended, as there are four systems of pilaster decoration that seem to have satisfied the wants of mankind in the best periods of art without any general modification or improvement.

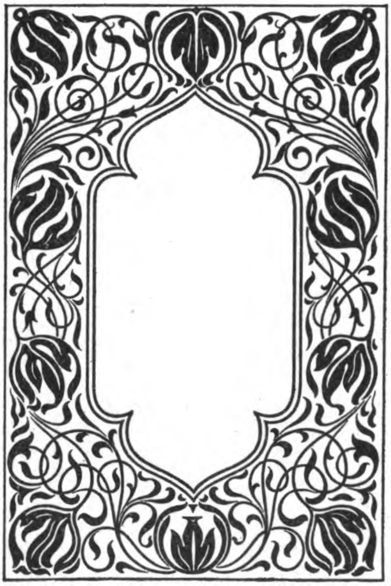


FIG. 18

20. In one of these systems the elements of the design are built in stages and symmetrically disposed around a central stalk, as shown in Fig. 20 (*a*). This method gives the impression of support and vertical feeling of stability characteristic of the pilaster itself. In the second method the details are apparently tied together in bunches and suspended over the surface of the panel of the pilaster by a cord or ribbon as shown in (*b*); this treatment should be used only when the pilaster itself is of vigorous design and requires no element to apparently strengthen its ability to support. A third method, shown in (*c*), is arranged upon a succession of volutes growing apparently in vine form from the bottom of the pilaster or panel and neither adding to nor detracting from its value as a structural member. The fourth method, shown in (*d*), is similar in effect to the one shown in (*a*), and is based on a series of wave lines crossing and recrossing a central stem without in any way adding to its apparent support.

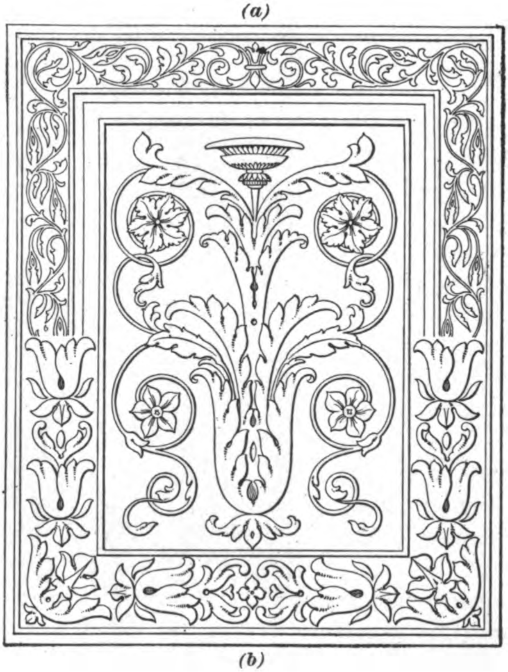


FIG. 19

21. **Corners.**—Besides borders and pilasters, consideration should be given to the corners where borders turn around a frame or wall surface. A frame is structurally formed in one of several ways, the three most prominent of which are shown in Fig. 21, where in (*a*) is seen a miter joint, in (*b*) a square joint, and in (*c*) the joggled, or halved, joint. The joint is

always apparently the weakest part of a structure, therefore the ornament should be added in such a way as to apparently strengthen this part of it, and in laying out a design it should

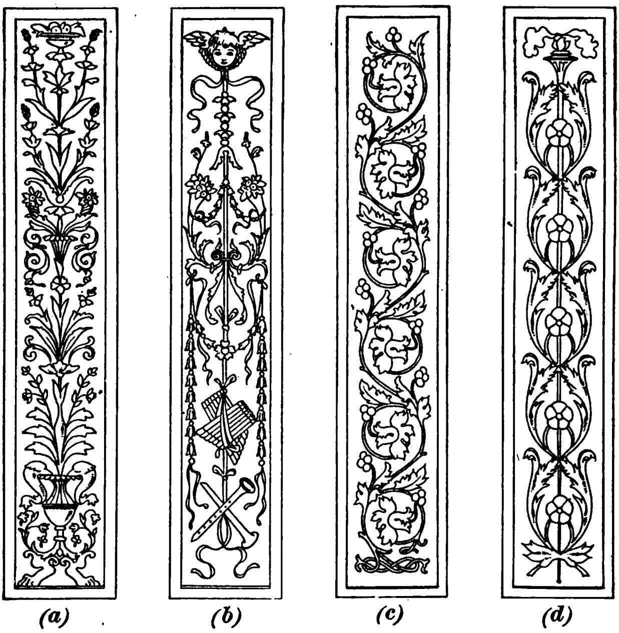

(a) (b) (c) (d)

FIG. 20

be started at the corner and the ornament applied in such a manner that it will appear to hold the corner in position and extend itself over the vertical and horizontal pieces.

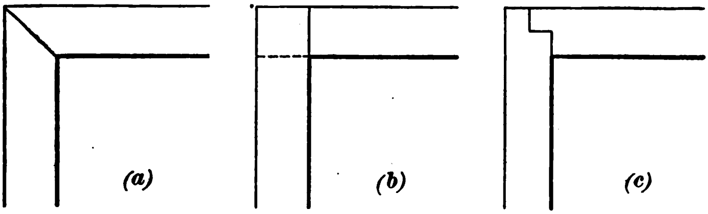


FIG. 21

While it is not the purpose, in this connection, to speak of the use of corners in various lines of practical work, such as rugs, tablecloths, lace curtains, etc., which will be taken up later, yet a discussion of the designing of borders must at times refer to their application to practical uses.

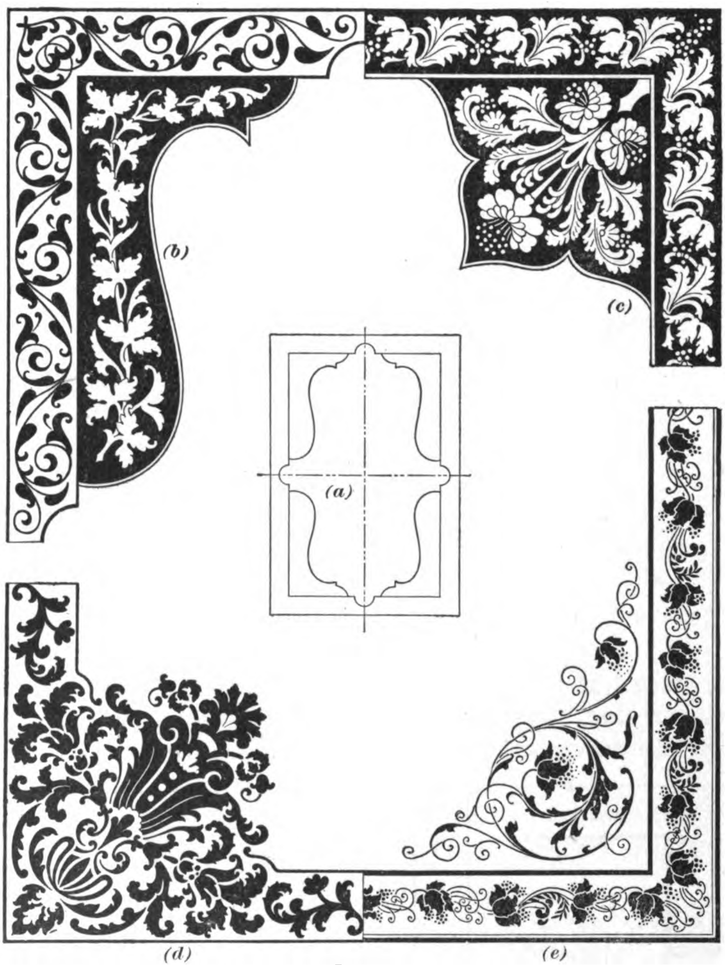


Fig. 22

22. In Fig. 22 are shown examples of borders and corners based on the vertebrate principle, but laid out on less conventional lines. The style of treatment suitable to certain classes of fabrics is illustrated in the design of the borders, where the character of the ornament is more suitable to floor coverings than to table covers, or hangings, inasmuch as the former lie flat and display the whole design, while in a table cover, or other hanging, the corner is usually lost by the folding of the cloth.

The purpose of any angle ornament is to break the crudeness of a sharp corner; but its form and contour must be consistent, so that it leaves a pleasing effect. In Fig. 22 (*a*) is shown the outline of a rug in which the border and corner design shown in (*b*) is used, and while the style of corner ornament shown in (*b*) is suitable only to a rug of oblong shape, the Oriental design in (*c*) is better adapted to a square rug, though it could be used in an oblong one without any sense of incongruity, whereas the form shown in (*b*) could not be used in a square rug.

In (*d*) is illustrated a corner design that breaks into the border and causes it to stop abruptly at each side. This design is symmetrical upon the miter line and is capable of reproduction on four sides of a square.

One other style of corner design is shown in (*e*), where the border runs around the corner, and repeats itself utterly independent of the corner ornament, and the corner ornament is woven or printed within the border line entirely independent of the border itself. This corner ornament is not enclosed in any definite outline as were those in (*b*) and (*c*), nor is it symmetrical on the center line as those in (*c*) and (*d*). It therefore requires separate consideration in design and needs no calculations for repeat in unison with a repeat of the border.

UNLIMITED AREAS

PLAIN REPEATING PATTERNS

23. All-Over Repeats.—Any design that consists of decorative motifs, either arbitrary or plant-form, evolved in the manner discussed in a former Section, may be said to be a repeating design or pattern. But, as here used, repeating pattern means an all-over repeat; that is, instead of the pattern being limited, as in limited areas, borders, corners, etc., the design spreads out in all directions, like the cells of a honeycomb, over an unlimited area.

24. Geometrical Basis for Repeats.—The experiments already made by the student have shown that repeating designs, in order to express properly the principles of unity, harmony, etc., must have a geometrical basis. The experiments in evolving designs were made with underlying bases of squares, diamonds, and triangles, and it was explained that many other geometric figures could also be used. In Fig. 23 (*a*) to (*f*), some of these geometrical figures are shown. In (*a*) the dotted lines form squares, one of which is shaded in with diagonal lines and is usually known as a unit of repeat. In (*b*) the unit of repeat is a rectangle; in (*c*), a triangle; in (*d*), a diamond, or lozenge shape; in (*e*), a hexagon; and in (*f*) the unit of repeat, which is made by means of double curves placed symmetrically in a rectangle, is what is termed an ogee (pronounced o-jeé) shape, because composed of two compound, or ogival curves.

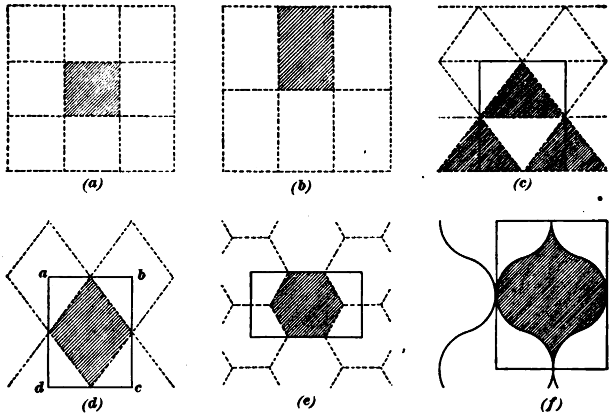
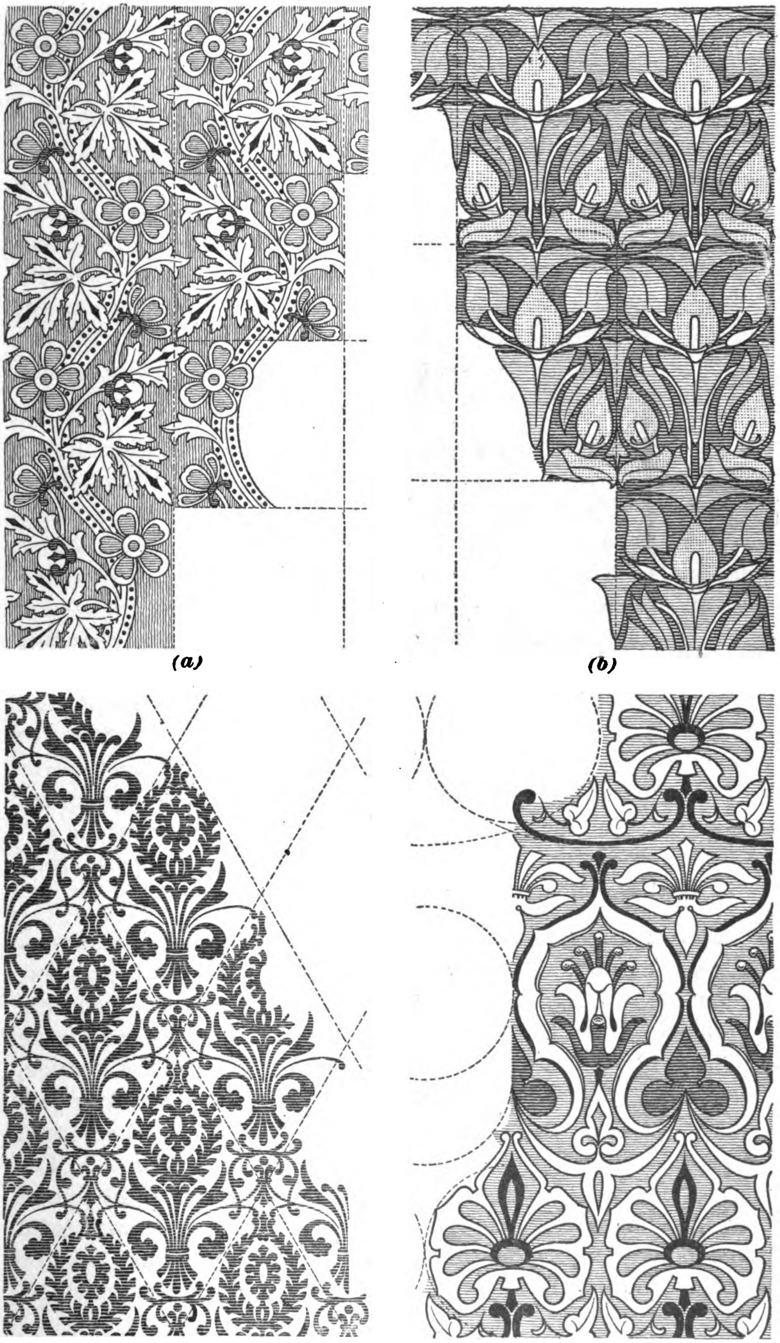


FIG. 23

25. Distinction Between the Unit and the Repeat. The unit has been clearly shown to be the geometrical figure used as the mechanical basis on which the repeating design is laid out. When each of these units has been more or less filled with a design motif or motifs, the decorative group thus appearing in each geometrical unit is called a repeat.



(a) (b) (c) (d)

FIG. 24

The repeat may not always fill the full extent of the unit, but often it does. For instance, in Fig. 23 (*a*) the shaded square is a unit, and, assuming that the shaded square were filled with a decorative motif, it would then be also a repeat, the unit and the repeat coinciding. However, if in (*d*) the rectangle *a b c d* were to represent the unit, and the shaded diamond shape contained in it were to represent the decorative motif; that is, the repeat, then the unit and the repeat would not entirely coincide, for the unit *a b c d* contains one whole repeat, or diamond, and four quarter-repeats.

26. Design Motifs Applied to Repeats.—In Figs. 24, 25, and 26 are shown the application of arbitrary and plant-form motifs to repeats of various kinds, the dotted lines in every case indicating the underlying geometrical units. In Fig. 24 (*a*) the design is based on the square, each square containing every detail of the pattern, the pattern being reversed, right and left, in each alternate square vertically. In (*b*) the rectangle is the underlying geometrical basis; in (*c*), the diamond, or lozenge shape; and in (*d*) the circle. In Fig. 25 (*a*) the pattern is based on a diamond-shape unit, the repeat being an ogee shape. In (*b*) the unit is the rectangle; in (*d*), the rectangle or diamond, depending upon how it is viewed; and in (*c*) the square diamond. In Fig. 26 (*a*) to (*f*) are shown characteristic all-over repeating patterns or designs, and the shapes of the units and the repeats are easily seen.

27. Planning and Developing Repeating Patterns. With the examples shown in Figs. 24, 25, and 26 as specimens, it will not be difficult to plan out and develop original repeating designs. First, attention must be given to the shape of the repeat. It is always best to construct the diamond, or lozenge, shape so that its vertical and horizontal dimensions are equal to the vertical and horizontal dimensions of a full repeat; and then to sketch in the principal details and general lines. The leaf forms can then be filled in so that the upper right line of the lozenge will cut these details in exactly the same form and position as the lower left-hand line, and the same may be said of the upper left-hand line and the lower right-hand line.

In general practice, the best way of doing this is to sketch the form roughly on transparent paper or tracing cloth, with a soft pencil. These forms may then be gone over with a harder pencil on the reverse side and these latter pencil markings, when placed face down and rubbed, can be transferred almost

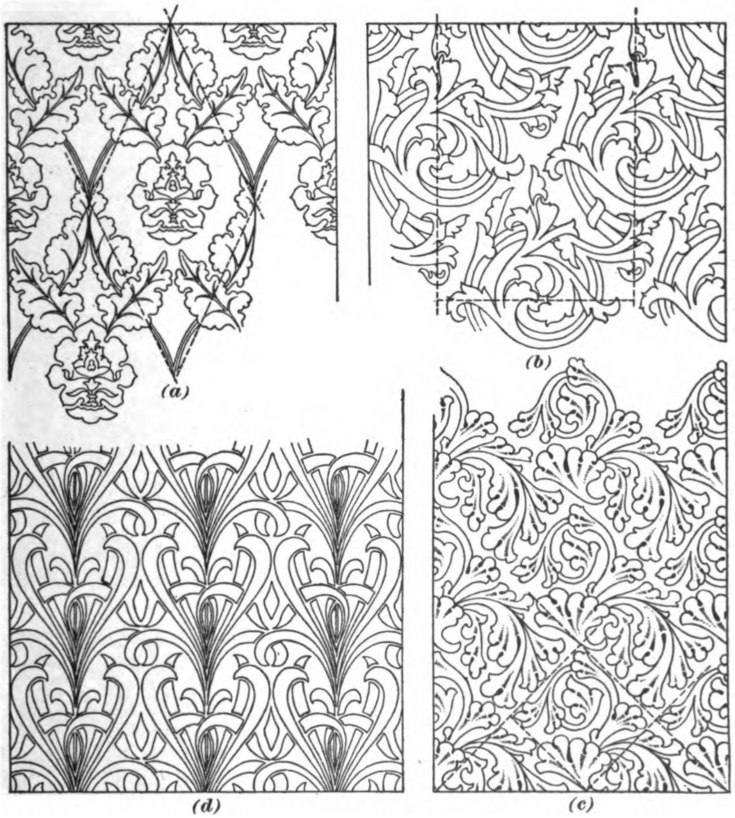
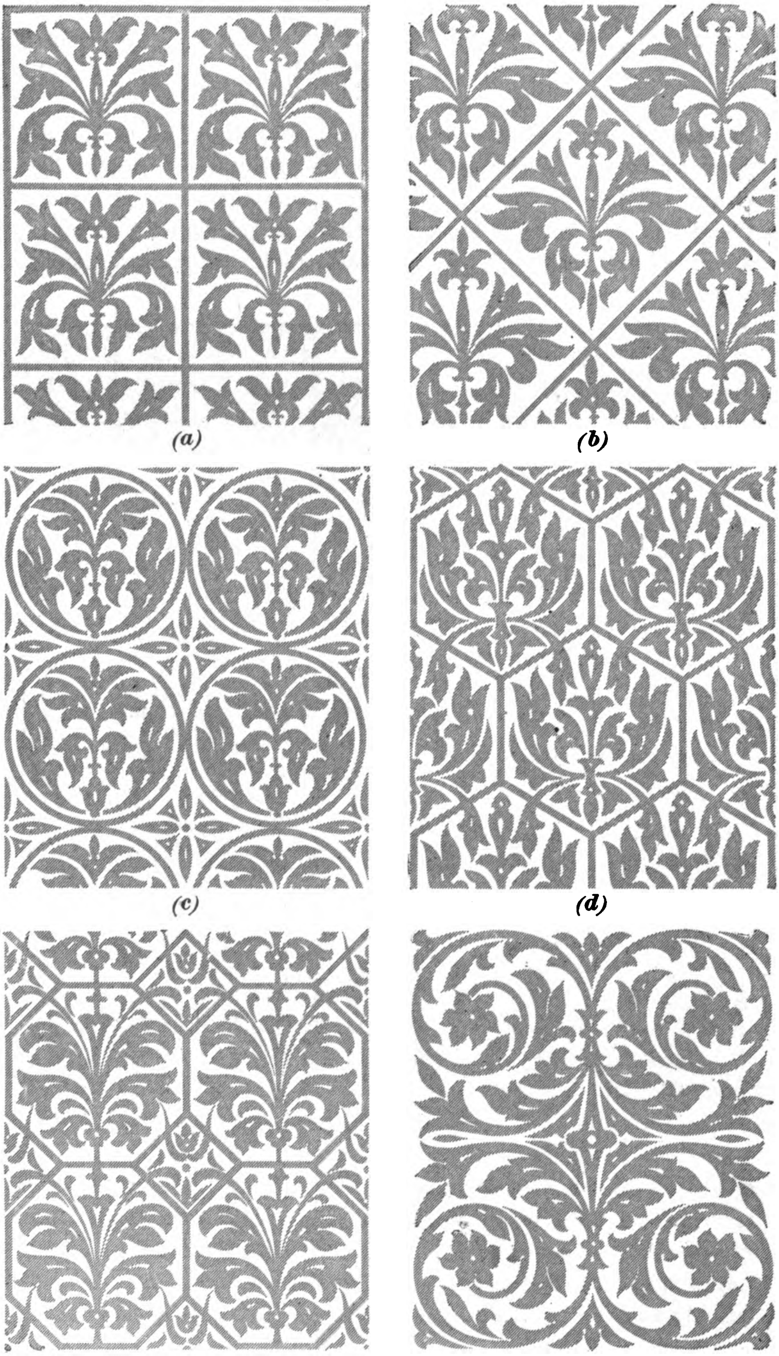


FIG. 25

exactly uniform to any part of the sketch. Hereafter, any references made to the use of tracing paper will in all cases mean simply the drawing or tracing of a design on transparent paper and the transferring of the design by means of that tracing to other parts of the drawing. In this way the details



(a) (b) (c) (d) (e) (f)

Fig. 26

of the general sketch may be multiplied and extended freely in every direction. When so multiplied and the forms appear to be well arranged and distributed, an exact drawing can be made by means of tracing paper and everything carefully drawn in its proper place.

28. Main Stem and Principal Feature.—In planning designs, it well to first draw the principal line, or the main stem, as shown by the double-curved line in the large rectangle, Fig. 27 (*a*). The designer must then determine whether this line is to form an essential detail of the design or simply to be a starting element. In many cases, the parent stem is used solely to give some logical growth and to provide some element that the flowers and leaves can spring from, but in no way forms an important part of the design itself, and it might be removed without impairing the effect. In this case, however, the parent stem is one of the most important factors and must be put in with care and thought.

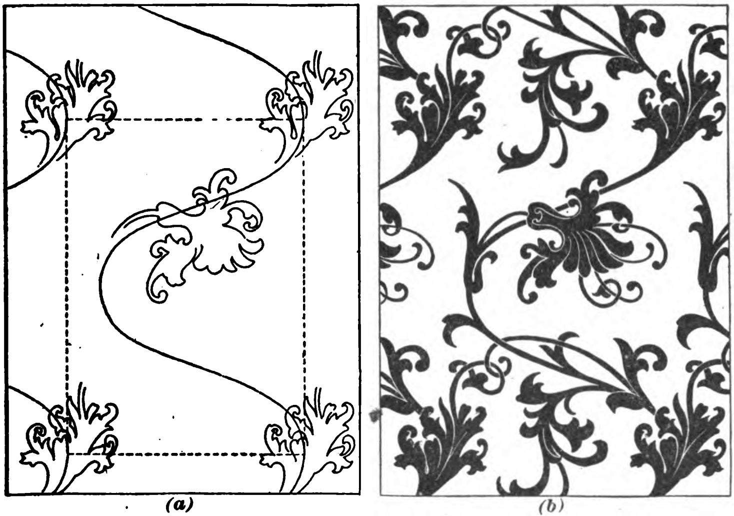

(*a*) (*b*)

FIG. 27

The next step is to locate the principal feature; for in all good designs there should be some feature that by its distinguishing color, shape, or size is more prominent than the others, and it should be so placed that it will immediately attract the eye. The means by which the eye is thus attracted must therefore be considered before the design is started. A design without a leading feature is uninteresting and tiresome, and since this feature is so important, it should be the most beautiful and the most interesting part of the design.

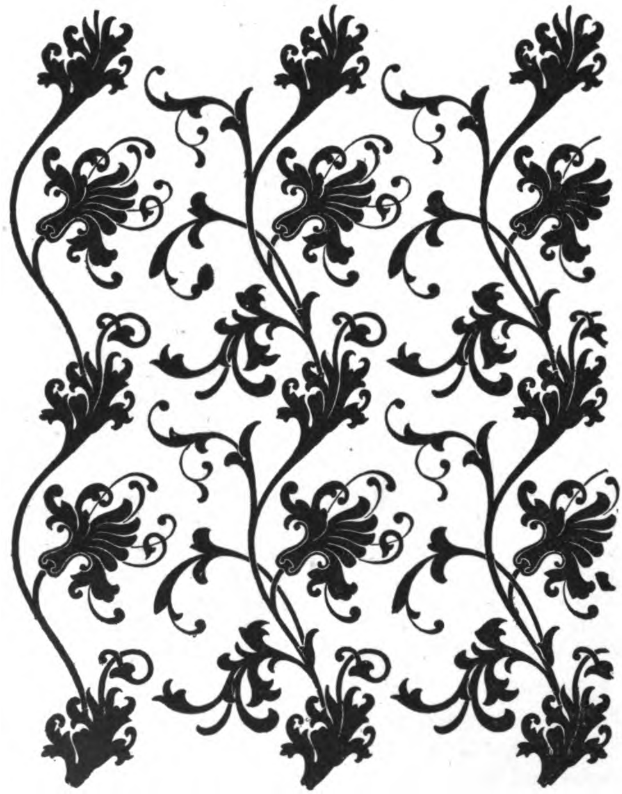


FIG. 28

In the present case, the repeat is first decided on and the wave line is carefully studied with the idea that it is to be a prominent detail in the finished design. Its curve must be graceful, of good proportions, and so arranged that it will not be inharmonious with adjacent curves in the other repeats. The large leaves occupying the four corners of each repeat, being intended for prominent features, should also be carefully drawn and placed in position. In general practice it is advisable to sketch the design in outline at first, as shown in Fig. 27 (*a*), because it is likely to be modified after being worked out and it would be a waste of time to work out the finished details at first.

The next detail in the preparation of the design is the conventional flower in the center of the repeat; and it would seem advisable to place this at some point central between the four large leaves. The necessity of the central position can be readily seen by referring to Fig. 28, where the design is the same as that shown in Fig. 27, except that the flower is not in the center but thrown to one side, over one set of the leaves. The effect of this removal of the flower from the center is that the character of the pattern ceases to be of the all-over type, and resolves itself into a series of stripes. The design would be considered suitable if a striped pattern were required; but when an all-over pattern is wanted, this treatment fails to fulfil the conditions; therefore, this central flower should be placed at a central point between the four large leaves. After the flower is drawn in outline, the rest of the figure is blocked in as shown in Fig. 27 (*b*).

In all cases in laying out a design, it is advisable to draw more than one repeat, as it is possible then to judge somewhat better the appearance of it when multiplied in the loom or the press. Few but the most experienced designers can judge the probable effect and know how to avoid faults that are likely to appear, unless several repeats are laid out in each direction.

DROP PATTERNS

29. Unit of the Pattern.—The drop pattern takes its name from a characteristic that requires the unit to be dropped one-half its length in order that adjacent members may properly match, and the lozenge shape has been suggested as the figure best adapted to constitute the repeat of any such pattern. In fact, this shape is used as the basis for nearly all repeating all-over patterns, and it is almost indispensable in the construction of the drop pattern. Every practical drop pattern, if properly analyzed, will be found with the lozenge as its fundamental form, though, as a rule, this shape is concealed in a superfluity of decorative details.

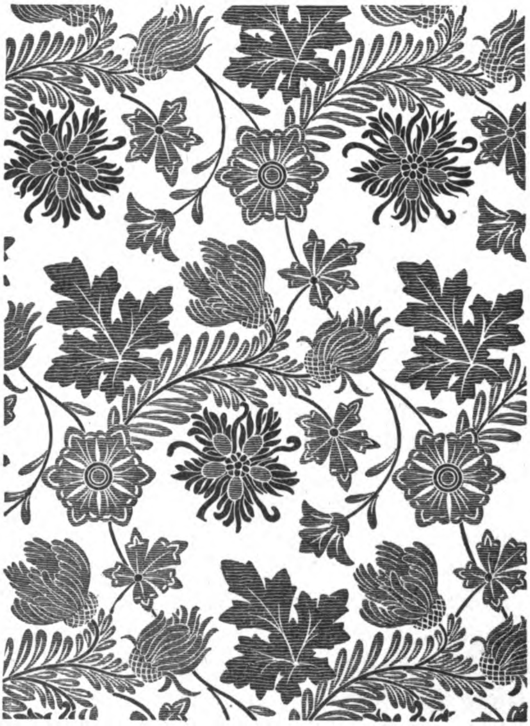


Fig. 29

In Fig. 29 the lozenge shape does not appear at all, although it can be easily shown that it is the governing principle of this design. If the four central points of the four large five-lobed leaves are connected by lines, the resulting figure is lozenge-shaped and a similar figure would be produced by joining any four repeating points in the design, as shown in Fig. 30.

30. Notwithstanding the fact that the lozenge shape is the governing principle of so many designs, the practical working out of the pattern in the loom, or the printing of the pattern in the press, requires that the design *shall be enclosed within a rectangle*, and the amount that has to appear in each rectangle will be one complete lozenge and four quarter-lozenges in order to make up the rectangle. An exception to this rule, however, will be found in certain classes of carpet weaving. In certain classes of practical work, as will be explained later, where a design is symmetrical on both sides of a given center line, as in Figs. 31 and 32, it is necessary to put on paper only half the lozenge shape, as indicated by the rectangles *a b c d* in both figures, because the other half, being a reversal of the half

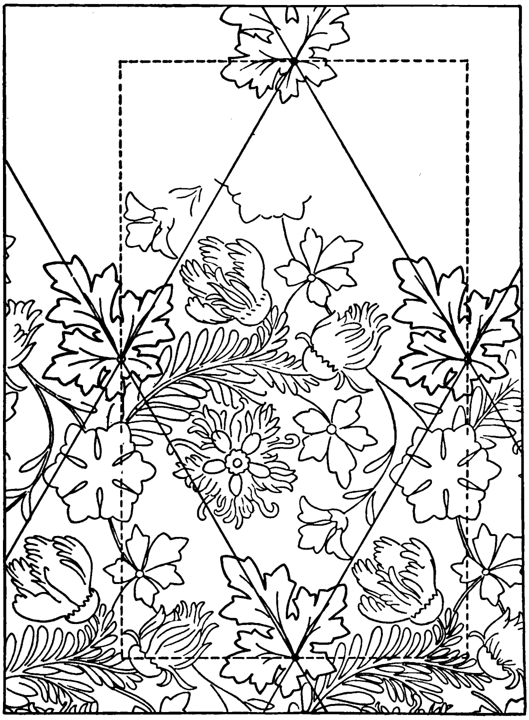


Fig. 30

shown, can be properly produced by the printing or weaving machinery.

31. Avoiding Striped Effects.—In the true drop pattern, the drop is always considered as half the height of the repeat; but it is not unusual to have a drop pattern of less than this, as, for instance, one-third the height of the repeat. This is shown in Fig. 33 (*a*), while in (*b*) the drop is only one-quarter of the height; but the result is never as satisfactory, as an even distribution is not so readily acquired and the comparative width of the repeat is greater.

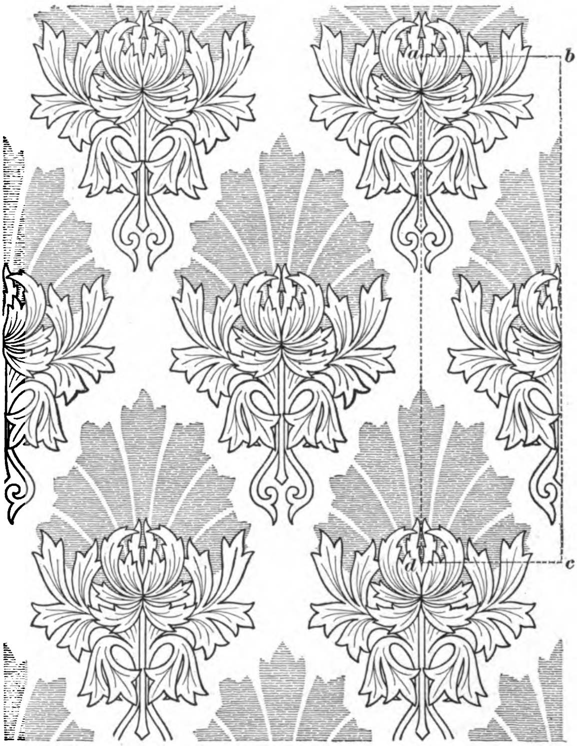


FIG. 31

The bringing of the principal elements so much closer together is also likely to produce a striped effect as shown at *a b* in

Fig. 33 (*a*) and at *c d* in view (*b*); whereas in (*c*), where the drop is half the height of the repeat, there is little or no tendency to get a striped effect, as the principal elements of the design are evenly distributed. The shorter the drop the stronger is the tendency to produce a pronounced stripe and increase the width of the repeat, and, therefore, the design is more expensive to work out without any compensating advantages in value as decoration. For this reason it should be borne in mind that drop patterns of less than half the repeat are to be avoided if an even distribution of design motifs is desired, and the tendency of any part of the decoration to run in stripes is to be obviated.

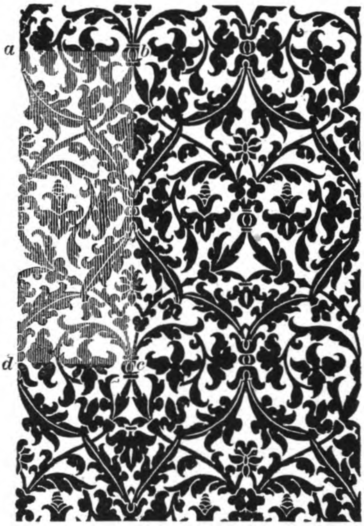
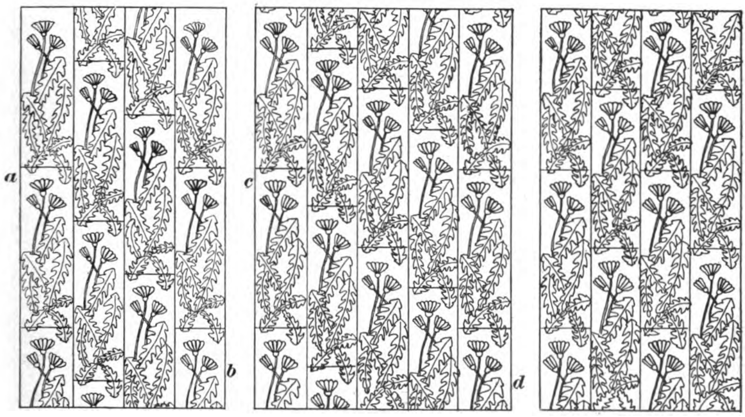


Fig. 32



(a) (b) (c)

Fig. 33

TURN-OVER PATTERNS

32. Advantage of the Turn-Over Method.—Another method of planning a design is called the **turn-over pattern,** and for many reasons is very desirable. With this method of planning, faults can be avoided with greater certainty and the design is given an appearance of greater complexity, as the repeats alternating to the right and left are less evident to the eye than when running in but one direction. This is a most useful system of planning, and, when properly studied, a design can be executed in which faults are least likely to occur; but the method is a most difficult one for the student

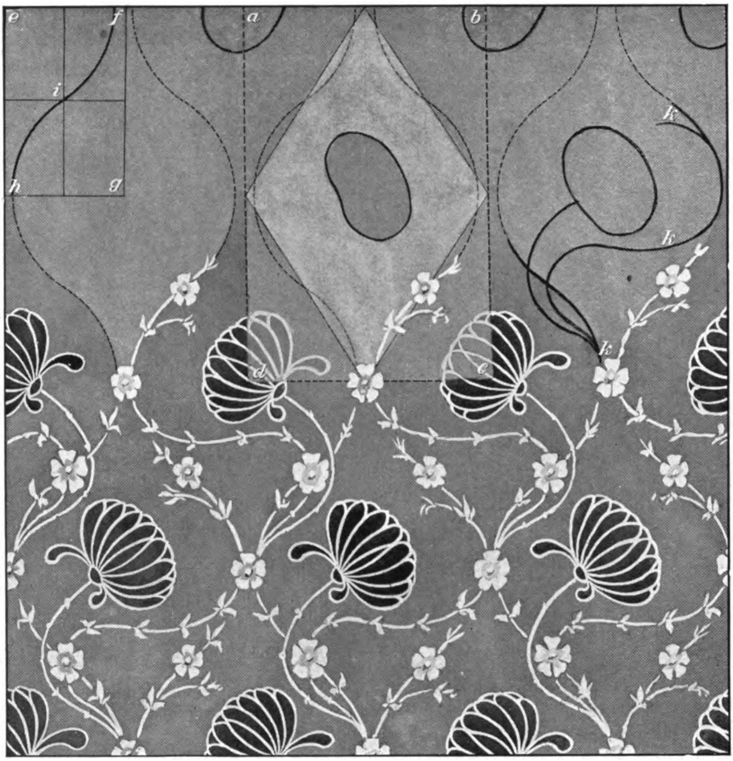


Fig. 34

to master, because when one repeat is reversed or turned over, the two repeats are likely to overlap in some of their details.

33. Planning the Turn Over.—In Fig. 34 is shown a design, with a turn-over repeat, with the geometrical construction and the main lines on which the whole is based. The first consideration is the proportions of the unit, shown at *a b c d*, containing but 1 repeat and 4 quarter-repeats surrounding it. This constitutes the geometrical construction of the design.

The next consideration is the character of the design itself; and if the ogee outline is used, as shown in this case, it is necessary to divide the top corner of the repeat into four equal parts, at *e*, *f*, *g*, *h*, and draw in the ogee line *f h*, in order to get any degree of accuracy. In fact, all that is required of this line is the portion from *f* to *i*, the other half being traced from it, as the two parts are exactly the same. The other four portions may be traced in a similar manner.

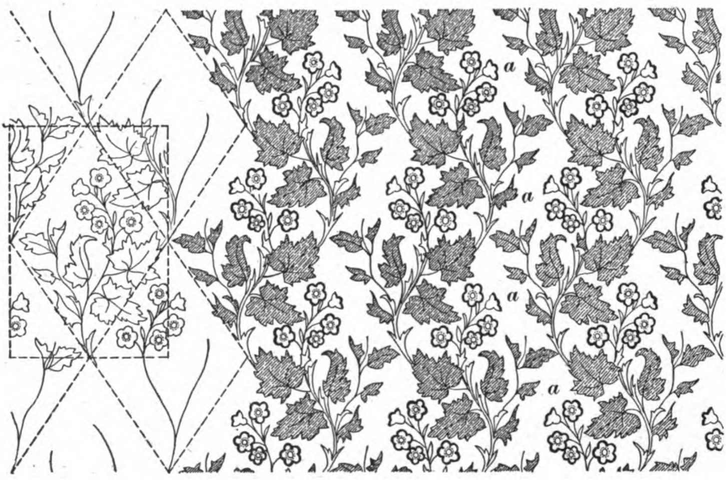
Next, the large flower in the center of each repeat should be placed in position, and care must be taken that each alternate horizontal series of repeats is turned in a different direction—one whole series toward the right, and another whole series toward the left as shown—as no other arrangement will produce the effect.

In the first blocking out of the design, much time will be saved if the main features are sketched with a single line as shown at the upper right corner of Fig. 34, where the oval shape stands for the flower in the center of the unit. When these oval shapes have been repeated a sufficient number of times, the lines of the ogee at *k* should be broken away from their regular direction, and the small flowers in each unit drawn upon these branchings.

34. Elimination of Faults.—By this time the design has been advanced sufficiently to enable the designer to look over it carefully and see that none of its details is likely to overlap or go wrong in any way. It is, however, almost certain that some detail will overlap another when the ornament is first drawn and turned over on the adjacent diamond, and if such overlapping occurs, the design must be altered. If, however, the design develops satisfactorily, the detail of the principal element in the center may be repeated in the four corners, at *a*, *b*, *c*, and *d*, and then the flowers distributed along the line *k k* may be sketched in place.

Even now, though the design is finished in the last detail, it is wise to look over it thoroughly, as it is almost sure to require some alterations, lest when turned over one portion will come into conflict with another; and the line where the first lozenge joins the four adjacent ones may be so thickly decorated as to appear heavy, or it may be so sparse that it requires filling. It is always at the points where these units join that the most skill is required in the arrangement.

35. Turn-Over-and-Drop Patterns.—In some of its details the turn-over pattern is not unlike the drop pattern; it requires 1 repeat and 4 quarter-repeats to make up the whole unit, and the unit contained in the whole lozenge is both turned over and dropped, so that in making the design it is necessary to trace off the first lozenge, reverse the tracing paper, and drop it to the adjacent lower lozenge. In fact, were it not for a



(a) *(b)*

FIG. 35

needless lengthening of the name, this style of design could better be termed the turn-over-and-drop pattern.

Turn-over designs are liable to the same faults as are designs that go only in one direction, but not to such a marked degree. This partial avoidance of faulty lining is one of the advantages, as the turning over of the unit causes a zigzag effect rather than a line effect. An illustration of this effect is given in Fig. 35, where in (*a*) a turn-over pattern is shown based on the wave line, and its unit is indicated by the lozenge shape in the center. Looking at this single repeat, it would be difficult for even an expert designer to predict that the whole design, when printed and many times repeated, would appear faulty; but this faultiness becomes very evident when the design is executed and a large surface spread out before the eye as shown in (*b*). If the design shown in (*b*) is held at arm's length and the eyes half closed, a white zigzag line will be perceived running systematically through the design from top to bottom, as marked at *a a a*, etc.

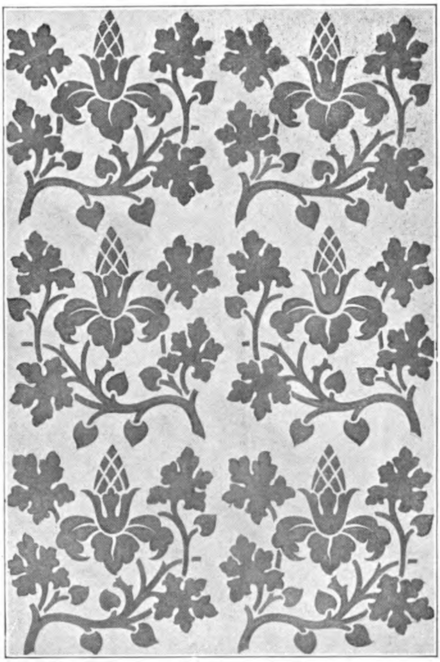


FIG. 36

This could easily have been avoided by the addition of another leaf in each blank, or by twisting around the little spray of conventional buds at the top so that they would fill the gaps. In fact, if the design is worked out enough to present such faults, they can usually be easily remedied; but they are very difficult to discern from one or even two or three adjacent repeats.

OTHER CLASSES OF REPEATING PATTERNS

36. Advantage of a Knowledge of Numerous Methods.—In order that designs may have variety, and that the work of each designer may not be stamped too much with his personal characteristics, it is necessary that he should be familiar with a number of different ways of planning a design; and whenever he sees the work of another designer he should study the system and analyze the geometrical elements of its construction. Having determined upon the geometrical basis, he should look for the principal spots, and then the secondary features, and the system of connecting them.

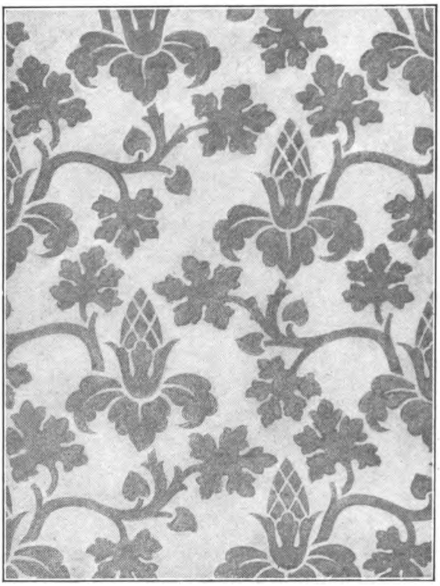


Fig. 37

37. Systems of Construction.—The choice of geometrical systems of construction on which a plan can be built is very limited, as for mechanical duplication it must be either a square or other rectangle, or some geometrical figure that will exactly fit inside a rectangle, and thereby be duplicated, The latter condition permits a plan to be arranged that is apparently irregular, provided all of its repeat can be fitted within the given rectangle; but care must be exercised under these circumstances to avoid an irregular or unsteady appearance. Thus it is understood why the endless variety of every class of repeating patterns that we meet can be traced to a rearrangement of the square, rectangle, and lozenge shapes.

38. Selection of a Suitable System.—The selection of the system of construction should not be made arbitrarily, but should always be decided after mature thought as to which would bring about the best result. The square produces a repeat in the same distance both vertically and horizontally, and the rectangle gives a repeat greater in one direction than the other, according to which way it is turned; the lozenge can be made to produce repeats in the same proportion as the square or rectangle, but produces an entirely different effect, as shown in Fig. 36, where the same design is worked out on the system of the square as is worked out on the system of the lozenge in Fig. 37. The former is much more severe than the latter, and the limits of the repeat are much more definitely marked. There is a tendency, too, toward the expression of a horizontal and vertical system of lining in Fig. 36 that is not so apparent in Fig. 37. It is therefore seen that for some conditions the square might be preferred to the diamond shape, while for other conditions the latter is preferable.

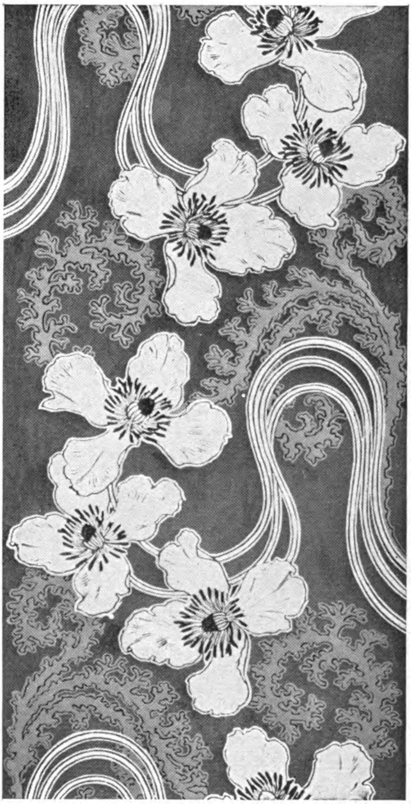


FIG. 38

39. Plant-Form Motifs in Unlimited Areas.—In Figs. 38 and 39 are shown some examples of conventionalized

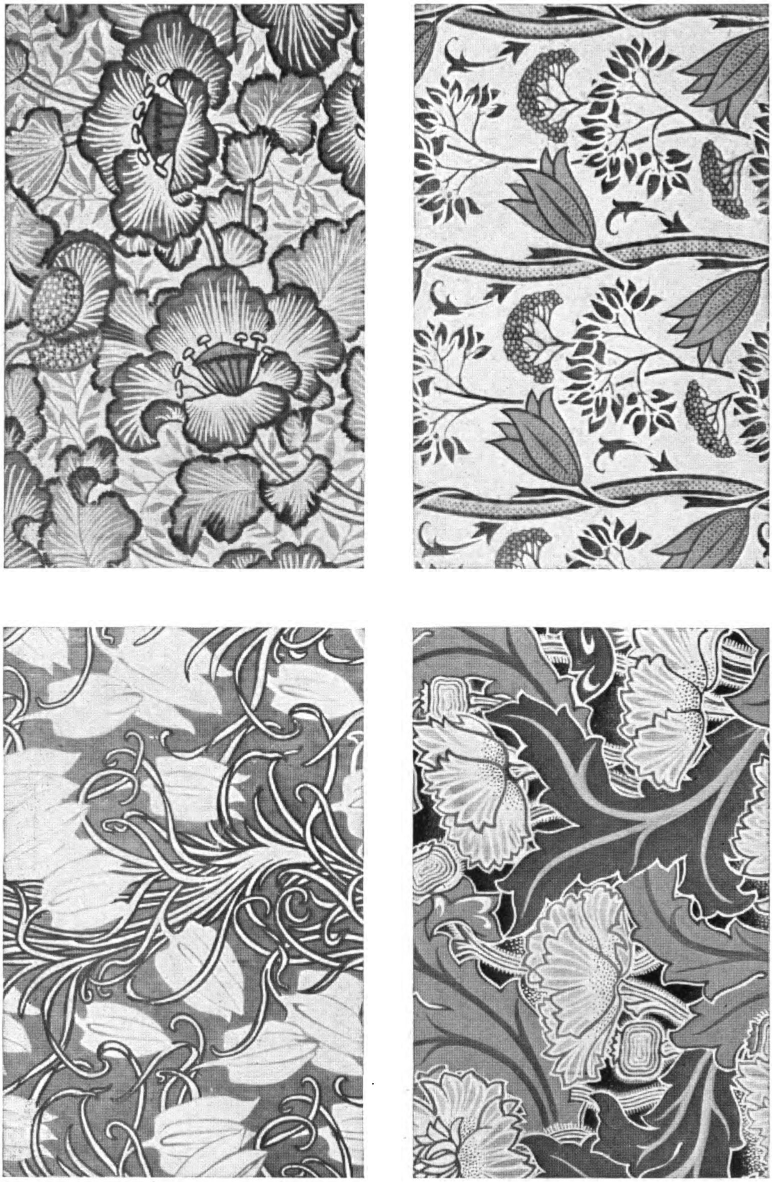


FIG. 39

40

plant-form motifs based on the methods of all-over repeats. In Fig. 38 the unit is rectangular, the repeat itself evidently being of the diamond, or lozenge, shape. In Fig. 39 the various units are clearly defined in each case. The chief item of interest about these repeating patterns is that they are very high-grade examples of conventionalization properly applied. In Fig. 38 the *art nouveau* feeling is very pronounced in the swirling growth and movement of the stems. In Fig. 39 the excellence of the designs, their skilful conventionalization and planning, and the masterful drawing, are fully explained when it is known that they are the work of the late William Morris, the great English artist and designer. They are introduced here to show the student how a skilful designer, although compelled to work upon a basis or groundwork of geometric shapes, by thoughtful planning in line, form, and mass, can cover and hide all evidence of mechanical or geometric units, and can make the finished design pleasing and beautiful in the highest degree.

It is hoped that these examples of William Morris's work, will prove to be an inspiration to the beginner in design work.

DESIGNING FOR SOLIDS

40. New Considerations When Designing Solids. The treatment so far in the evolving of designs has been confined entirely to designs for surfaces. When evolving designs for solids new considerations enter.

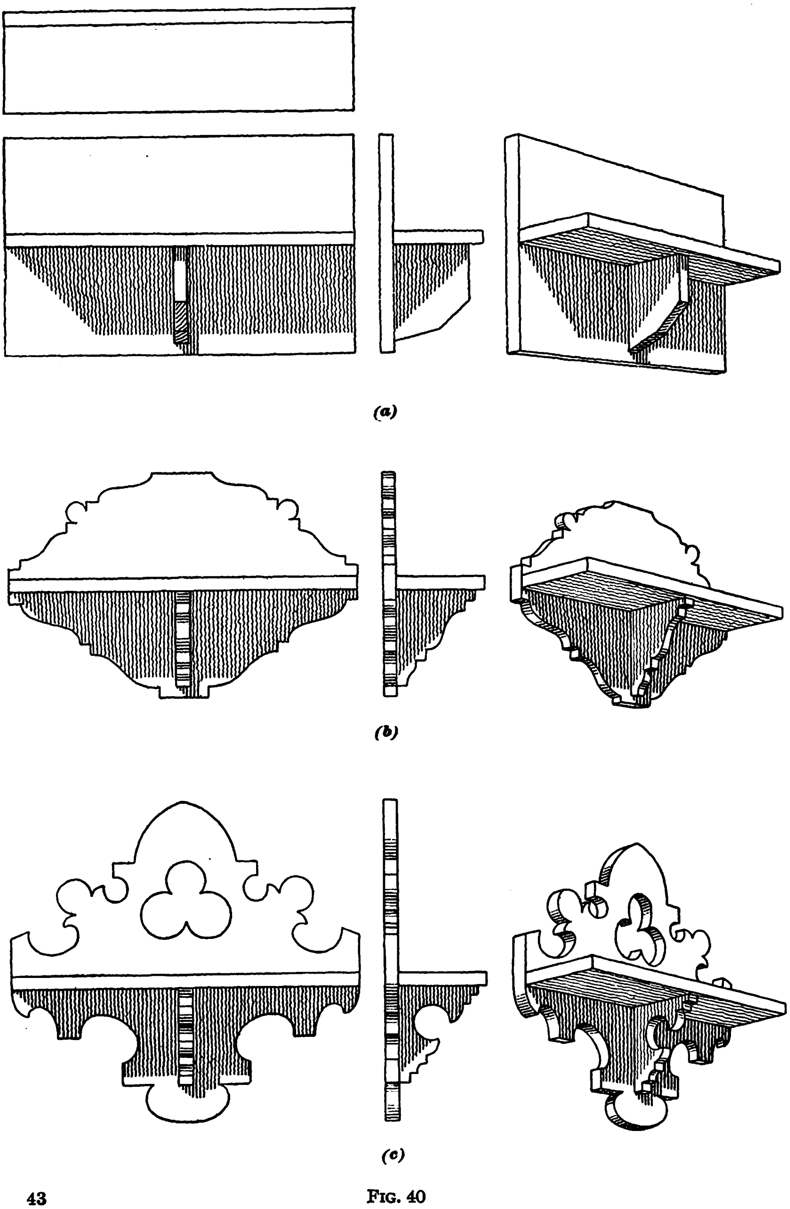
In the case of designs for surfaces, there is more or less of a given space to fill with appropriate and pleasing forms that are suited to their place and purpose. In the case of designs for solids, there are three or more sides to be considered, separately or together, according to their purpose in enclosing the solid. Since a surface design is nearly always viewed as a surface and is not materially affected by the point of view, it can be designed simply as a surface. A solid, however, materially changes in appearance according to its position above or below, or to the right or to the left of, the eye; for in these different positions its surfaces vary in proportion to each other and present varying appearances; hence, a solid should be designed in perspective; that is, so that more than two of its sides or faces show.

Though an object may be composed of several surfaces that are purely for purposes of utility, it may be made beautiful in form by giving these surfaces pleasing outlines. Care should be taken, however, that the structural lines are not lost nor the utilitarian purpose of the object impaired by the decorative lines and forms, or the details employed.

41. Making Utilitarian Objects Also Decorative.—As a transition from the evolution of designs for surfaces to those for solids, it may be of assistance to the student to consider the case of the bracket, shown in Fig. 40. In Fig. 40 (*a*) are shown the plan and front, side, and perspective views of a wooden bracket with a backboard and shelf. This bracket consists of three pieces of 1-inch board put together in the manner shown. So far as its utilitarian purpose is concerned, the shelf is satisfactory and will carry all that was intended for it. But, if curves are substituted for the straight lines, wholly or in part, the entire character of the bracket may be changed; and, without losing in the slightest degree any of its utilitarian value, it becomes pleasing to look at and in itself decorative. A comparison of views (*a*), (*b*), and (*c*) will show how, without adding any outside detail or device, the elements constituting utility and beauty can all be combined in one design.

There is an unlimited variety in the curves that can be substituted for the straight lines shown in view (*a*); but the curves in the bracket, shelf, and backboard should be in harmony, or their lack of proportion will render the bracket less pleasing in appearance than the simple utilitarian device. Views (*b*) and (*c*) are examples of pleasing and harmonious curves.

The principle by which the simple utilitarian bracket of Fig. 40 (*a*) was converted into the decorative device shown in views (*b*) and (*c*) can be extended to objects of any proportion and size.



(a)

(b)

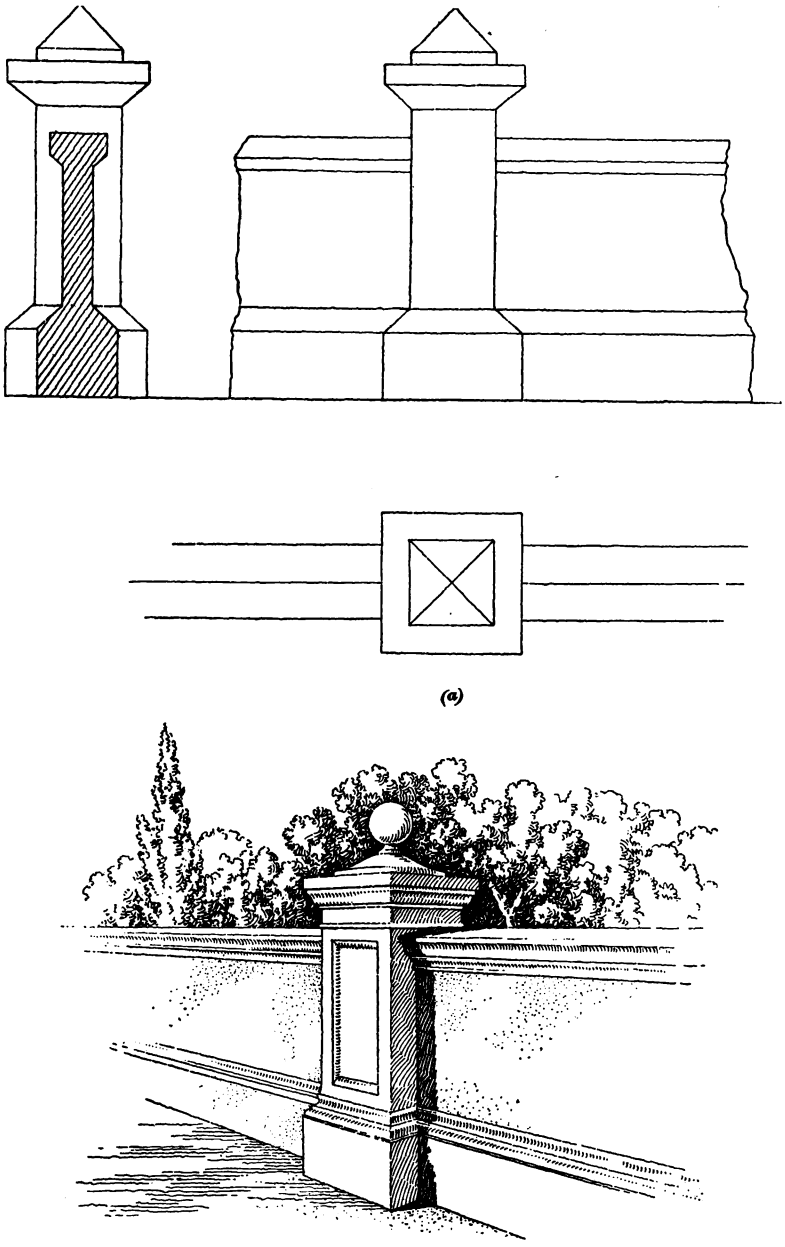
(c)

FIG. 40

In Fig. 41 (*a*) are shown a plan, front view, and end view of a low parapet wall interrupted by a post. This is a utilitarian construction consisting of a simple geometrical form for the post, from which extend perfectly flat walls with coping and base. The coping is beveled on its under side at an angle of 45°, both on the wall itself and on the post, and the base that extends around the post and along the wall is similarly beveled, but no attempt is made to indicate the existence of moldings. Now, if curved lines are substituted for the straight lines of the inclined surfaces and these are molded harmoniously, the utilitarian construction will be converted into a decorative or ornamental one, as shown in Fig. 41 (*b*), that is just as suitable to its purpose in every way, but much more pleasing to the eye. Thus a solid is designed.

42. Principles of Design Applied to Solids.—In designing the shape of a solid that is to be an object of both utility and beauty, there must be applied the same principles of design composition that were discussed in the case of surface designs; namely, unity, balance, rhythm, harmony, repetition, alternation, contrast and variety, symmetry, etc.

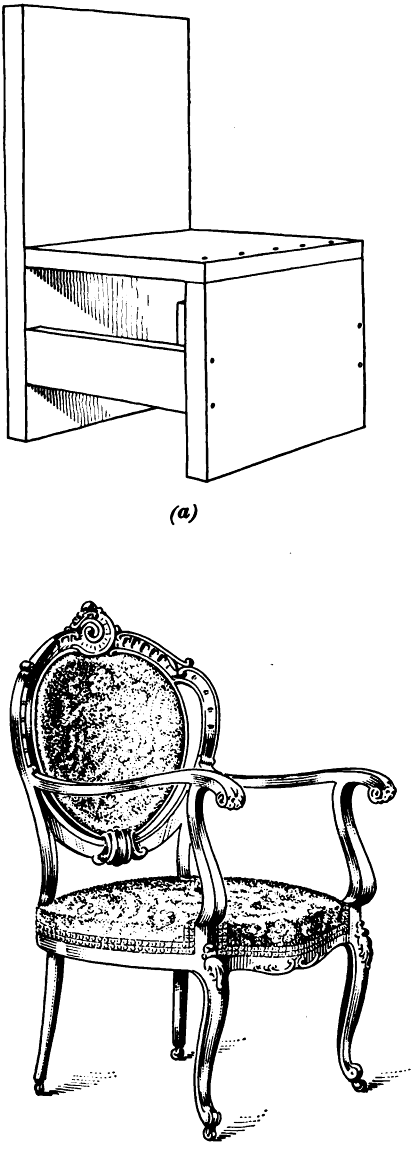
In the case of a solid, however, there is an arbitrary shape or form to start with, which must be conformed to, no matter how graceful or pleasing the decorative shape is made. For instance, the bracket in Fig. 40 must be based on the structural shape shown in (*a*); and any designing for beauty's sake must not disturb or change, but must be based on, the fact that a bracket to be useful must have a backboard, a shelf, and a supporting member for the shelf. Likewise, as shown in Fig. 42 (*a*), every chair design must be based upon the fact that a chair to be of any use must have a horizontal seat, a back, a supporting member in front for the seat, and strips on each side to make the whole construction firm and stable. Further, as shown in Fig. 43 (*a*), in making a design for a piece of jewelry, such as a necklace, whatever decorating or ornamenting is done must be based on the fact that a necklace is a string or band that goes around the neck, fastens at the back, and hangs loosely in front over the pit of the throat.



(a)

(b)

FIG. 41

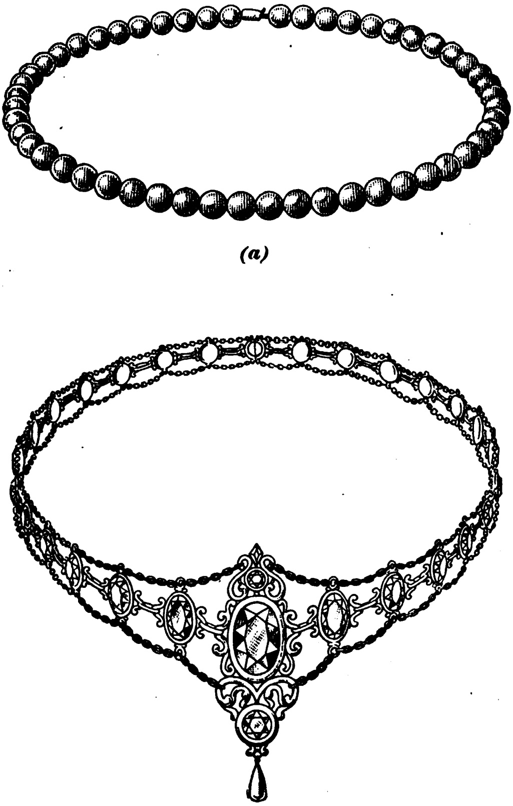


(a)

(b)

Fig. 42

Returning again to the chair in Fig. 42, it might be said that an article, as shown in (*a*), on which one can seat himself, would be quite satisfactory for all practical purposes. This is true, but many conditions arise, when chairs must be used, where such a stiff, rigid form would not be desirable, and certainly would be inharmonious and out of place. Further, it uses up too much material and is too heavy and clumsy to be moved about easily. In altering the stiff, rigid shape, the back is made open, the vertical slab in front becomes two legs, as does also the lower part of the rear slab, and instead of broad, heavy pieces to strengthen and make stable the lower part, thin, rails or spindles are used. To these parts may now be applied the principles of unity, balance, rhythm, harmony, etc., just as in the case of a surface pattern. Unity is already partially expressed by the fact that back, seat, legs, etc. are such component related parts; but it may be further expressed by using curved lines of the same character throughout the parts, as shown in Fig. 42 (*b*). Rhythm and harmony are illustrated in the way the back and rear legs are curved inward to conform to the curve of the front legs, the swell of the seat, the arms, etc. If the front legs had been perfectly straight and rigid and the arms swelling and curved as shown, rhythm and harmony would have been lacking. The other principles of design, as applied to the chair, can be traced quite readily in Fig. 42 (*b*).


(*a*)

(*b*)

FIG. 43

Further, the simple shape of a continuous string, or chain, shown in Fig. 43 (*a*), would serve very well for a necklace, but. since the main purpose of a necklace is adornment, this simple string or chain needs to be elaborated upon, as shown in Fig. 43 (*b*), in which the principles of design have again been applied. Unity is shown by making the front central stone quite large and having the others grouped about it so as to lead up to it. Rhythm and harmony are shown by the way in which the stones and their settings gradually decrease in size, thus making graceful contour lines at the top and bottom of the front part; the necklace is also improved by adding extra pendant stones at the bottom of the large central stone. The arrangements of these stones and their settings also show clearly the application of the principles of repetition, alternation, contrast, and variety.

Examples could be multiplied of the beautifying of utilitarian objects and articles by the application of the principles of design; but, as the purpose here is simply to present the principles of space filling in three dimensions, the technicalities of designing for solids will be taken up in later Sections.

SPACE-FILLING EXERCISES

GENERAL INFORMATION

43. Required Work in This Section.—The purpose of the exercises in this Section, as in the previous one, is to give a training in the elementary stages of designing. The drawing plates will therefore comprise exercises in making designs for spaces of various kinds, such as limited areas, borders and corners, unlimited areas, or repeating patterns, and for simple solids. These exercises in designing must of course be original.

44. Character of the Drawing Plates.—The drawing plates are to be four in number, each about 10 inches wide by 15 inches high, the exact size depending on the kind of paper that is used. Plate 1 is to be divided by horizontal and vertical lines, into four equal rectangles 5 inches wide by 7½ inches high; Plate 2, into two 10″×3¾″ and two 5″×7½″ rectangles; and Plates 3 and 4 into two equal rectangles, running across the plate, each 10 inches wide by 7½ inches high. The plates are to be sent to the Schools one by one for examination, work being started on a new plate while the one submitted is being examined and returned.

The work on the designs may be done in soft pencil, in pen and ink, or with ink and a brush, as preferred. The purpose of the work is not to prepare designs technically correct for some fabric or object, but simply to serve as exercises in space filling; therefore, the medium that is used is of no particular importance. The important thing is to fill the spaces properly.

All designs are to be original, and must not be copied from any illustrations in this or any other book.

PLATE 1

45. Exercise A, Plate 1.—In the upper left-hand 5″×7½″ rectangle, lay out a 3-inch or 4-inch square, and fill it with a design that is symmetrical. The design may start at the center of the square and grow outwards toward the corners and sides; or start at the outside edges and grow toward the center, as desired.

46. Exercise B, Plate 1.—In the upper right-hand 5″×7½″ rectangle, lay out a triangle with each side 3 inches or 4 inches long, resting on its base, and fill the triangular shape with a symmetrical design. The design may grow from, or toward, the center of the triangle, or may grow out of the center of the base, as desired.

47. Exercise C, Plate 1.—In the lower left-hand 5″×7½″ rectangle, lay out a 3-inch or 4-inch circle, and fill it with a design that is symmetrical. The design should grow from the center outwards; and, if arranged as a number of symmetrical divisions revolving around the center, these divisions should be an odd number, as 3, 5, 7, 9, etc.; and not an even number, as 4, 6, 8, 10, etc.

48. Exercise D, Plate 1.—In the lower right-hand $5'' \times 7\frac{1}{2}''$ rectangle, lay out a spandrel shape, such as is shown in text, Fig. 1 (*c*), and fill it with a symmetrical design growing up along the vertical center line and outwards to the left and right points.

49. Final Work on Plate 1.—Letter or write the title, Plate 1: Space Filling, at the top of the sheet, and on the back place class letters and number, name, address, and date of completing the plate. Roll the plate, place in the mailing tube, and send to the Schools for examination. Then proceed with Plate 2.

PLATE 2

50. Exercise A, Plate 2.—In the upper $10'' \times 3\frac{3}{4}''$ rectangle, extending entirely across the plate, lay out a border, 2 inches high by 8 inches long, that consists of a continuous running design; similar to text, Fig. 14 (*a*), but not a copy of it.

51. Exercise B, Plate 2.—In the second rectangle from the top, 10 inches by $3\frac{3}{4}$ inches, extending entirely across the plate, lay out a border, 2 inches high by 8 inches long, that consists of a number of vertical elements spaced at uniform intervals; similar to text, Fig. 14 (*b*), but not a copy of it.

52. Exercise C, Plate 2.—In the lower left-hand $5'' \times 7\frac{1}{2}''$ rectangle, lay out a design, 3 inches by 5 inches, or 4 inches by 6 inches, for a border and corner, where the design belongs entirely to the border and is not connected at all with the ornament inside the filling, or large rectangle that is enclosed by the border. Refer to, but do not copy, text, Fig. 22 (*e*).

53. Exercise D, Plate 2.—In the lower right-hand $5'' \times 7\frac{1}{2}''$ rectangle, lay out a design, 3 inches by 5 inches or 4 inches by 6 inches, for a border and corner where the design merges into and becomes a part of the ornament inside the filling, or large rectangle enclosed by the border. Refer to, but do not copy, text, Fig. 22 (*d*).

54. Final Work on Plate 2.—Letter or write the title, Plate 2: Space Filling, at the top of the sheet, and on the back place class letters and number, name, address, and date of completing the plate. Roll the plate, place in the mailing tube, and send to the Schools for examination. Then proceed with Plate 3.

PLATE 3

55. **Exercise A, Plate 3.**—In the upper 10″×7½″ rectangle, lay out a space about 8 inches wide by 6 inches high; fill it with rectangles or diamond shapes, as in Fig. 23 (*b*) or (*d*), and then design an all-over repeating pattern to fill these rectangles or diamond shapes. Refer to, but do not copy, text, Figs. 24, 25, and 26. All construction lines for the basic rectangles or diamond shapes must be allowed to remain.

56. **Exercise B, Plate 3.**—In the lower 10″×7½″ rectangle, lay out a space about 8 inches wide by 6 inches high; fill it with rectangles showing the arrangement of the *drop repeat*, as in text, Fig. 33 (*a*), and then design a drop repeat to fill these rectangles, and thus make an all-over repeating pattern. Refer to, but do not copy, text, Figs. 29 to 33, inclusive. All construction lines for the basic rectangles forming the geometric basis for the drop repeat must be allowed to remain.

57. **Final Work on Plate 3.**—Letter or write the title, Plate 3: Space Filling, at the top of the sheet, and on the back place class letters and number, name, address, and date of completing the plate. Roll the plate, place in the mailing tube, and send to the Schools for examination. Then, if all uncompleted work on previous plates has been completed, proceed with Plate 4.

PLATE 4

58. **Exercise A, Plate 4.**—In the upper 10″×7½″ rectangle, lay out another rectangle, in outline, about 8 inches wide by 6 inches high, and within this space make a design for a chair, showing it as a pictorial sketch, foreshortened. Apply to the design the principles of correct designing. Do not

copy any illustration in the text of this or any other book; make an original design for a chair that is not overly decorative but simple and graceful in shape. Render in soft pencil or pen and ink, as preferred.

59. **Exercise B, Plate 4.**—In the lower 10″×7½″ rectangle, lay out another rectangle, in outline, about 8 inches wide by 6 inches high, and within this space make a design for a necklace, showing it as a pictorial sketch. Apply to the design the principles of correct designing. Do not copy any illustration in the text of this or any other book; make an original design for a necklace that is graceful in form and proportion.

60. **Final Work on Plate 4.**—Letter or write the title, Plate 4: Space Filling, at the top of the sheet, and on the back place class letters and number, name, address, and date of completing the plate. Roll the plate, place in the mailing tube, and send to the Schools for examination.

If any redrawn work on any of the plates of this Section has been called for and has not yet been completed, it should be satisfactorily finished at this time. After all the required work on the plates of this Section has been completed, the work of the next Section should be taken up at once.

COLOR IN DESIGN

PURPOSE

1. Importance of Color in Designs.—The considerations so far in the use of design motifs and the evolution of design patterns have been limited to line and mass in black and white. There remains to be considered the crowning feature of all design work, as also that of all nature, namely, **color**. Whatever may be the opinion of educators or the public as to the question of color study by the design student, the one important point that shows the necessity for such study is that good color is needed in practical commercial design work. This, therefore, is the strongest reason why the study of color in design work is necessary.

The student takes up this work, not merely to learn theories and principles, but to be able to prepare practical designs for definite purposes. There is hardly any line of handicrafts work or commercial designing where the importance of good color is not evident. Stenciled fabrics, block printing, wall-papers, rugs, fabrics, and decorations of all kinds depend for their effectiveness on good color.

2. Color in Theory and in Practice.—Two distinct stages must be passed through by one who is learning to use color in design. First, he must learn the theory and principles of color; and, second, he must actually experiment with colored pigments in order to put into practice and to test the color theory he has learned. He cannot expect to do designing in

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color simply from having learned color theory and principles; nor can he do successful color work by ignoring color theory and principles and attempting at once to work directly with pigments. Theory and practice must be combined in the order mentioned; and such is the method followed in this Section.

THEORY AND PRACTICE OF COLOR

COLOR PERCEPTION

3. **Scientific Basis for Color Theory.**—The belief has been prevalent that certain elements in art work, as atmosphere, color, etc., exist of themselves in the artist's brain and find their expression on paper or canvas through a sort of special gift or inspiration. This idea is being exploded thoroughly nowadays, and it is coming to be well understood that the artist-designer is dependent on exact scientific rules and discoveries. This is true as much in the case of color as in any other feature of art work. There are certain laws of optics, of color combinations, etc., that are as definitely established as certain principles in mathematics, and, if these scientific laws are followed, the so-called color sense and good taste in color work on the part of the designer becomes a certainty and not guesswork.

4. **The Sensation of Color.**—What is familiarly called *color* is the sensation or impression produced upon the optic nerve by the number and character of rays of light that come to the eye. They are part of the action of one's sense of seeing. While there are five senses—the senses of sight, hearing, touch or feeling, taste, and smell—it must be understood that there is no sensation outside of oneself. An example may make this clearer. It is well known that the sense of hearing, or the sensation of sound, is due to the vibration of the drum of the ear, and that where there is no ear present to receive these vibrations that are transmitted through the air there is no existing sound.

In a similar manner, one can study the sensation of light. The effect of light is produced by the vibration of what are usually termed *light waves*, and these vibrations affect the retina of the eye to produce the sensation of light somewhat after the manner that the vibrations of the air affect the drum of the ear and produce the sensation of sound.

If all the rays of light that come from the sun and fall upon objects were reflected from those objects to the eye of the observer, all objects would appear white; that is, nothing would have color. But the texture and composition of the exterior surface of an object, or of the covering (paint, dye, etc.) of that object, differ from the texture and composition of the surfaces of other objects in such a way as to absorb certain light rays and to give out, or reflect, others. For instance, if an object is painted with a certain pigment which makes the object appear to be yellow, this means that the paint has the property of absorbing and retaining all the colored rays of the spectrum except the yellow rays, the yellow rays being reflected to the eye.

5. The Spectrum.—The phenomenon just described is based on the fact that sunlight, or other white light, consists of a number of rays of colored light, as can be determined easily. The breaking up of white light into its component parts may be seen in the rainbow, where the sunlight passing through drops of rain is refracted and broken up into seven colors. A more satisfactory breaking up of sunlight into its component rays of colored light may be accomplished by using a glass prism upon which a single ray of sunlight is allowed to fall. Thus it will be demonstrated that sunlight is composed of a combination of seven separate colors: violet, indigo, blue, green, yellow, orange, and red. These colors, arranged in the order mentioned, comprise the **solar spectrum.**

An object absorbs and retains certain ones of these colors, as violet, indigo, blue, green, yellow, and orange, and gives out, or reflects, the remainder, as red, and is therefore referred to as **a red** object. Or, should the object absorb all color rays except yellow, it would be called a **yellow** object.

CLASSIFICATION OF COLORS

6. Basis of Classification.—All classifications of the various spectrum colors—violet, indigo, blue, green, yellow, orange, and red—must of necessity be arbitrary. The only reason for such classification is to give the worker in colors a basis upon which to proceed when using colors and when harmonizing them.

For the practical worker with colors any classification adopted must be from the standpoint of actual pigments; that is, paint applied to the paper or canvas, and not from the standpoint of optics, colored lights, etc., which is purely scientific, and only confusing to the student. The practical designer need not confuse himself by juggling with the scientific laws of colored lights; such a task belongs to the province of the psychologist and physicist and not to that of the artist. The former deal with color sensations, but the artist deals with colored pigments. The former, in their experiments, would make yellow and blue, for instance, to be complementary colors (to be described later) while the practical user of color, the artist, finds that yellow and blue are primary colors—that is, indissolvable colors (to be described later). The explanation is that the psychologist and the physicist find that color sensations are carried to the eye in a confusion of different sensations, but when the artist uses pigment colors the result is carried to the eye in one definite sensation.

This explanation is made to put the student on his guard against being confused by so-called color systems that attempt by experiments with colored lights to establish an arbitrary classification of colors at variance with the well-established classification presented here.

For convenience, and to best serve the designer's purpose in working practically with colored pigments, the classification will be: *primary colors*, *secondary colors*, *tertiary colors*, and *color grays*.

7. The Primary Colors.—In looking over the seven spectrum colors, in pigment form, it is found that there are three, each one of which stands alone and cannot be broken up into any other component colors. These are **red, yellow,** and **blue.** One can see, in the pigment colored **red,** only red and nothing else. Similarly, in the pigment colored **yellow,** one can see only yellow. Likewise, in **blue** pigment, one sees only blue. But, with the other colors of the spectrum, the result is different. **Violet** contains a great deal of red and a little blue; **indigo** contains a little red and a great deal of blue; **green** contains some blue and some yellow; **orange** contains some yellow and some red. Thus red, yellow, and blue are the only spectrum colors in pigment form that cannot be broken up into any other colors; and they could be just as well called the indissolvable colors. However, for convenience, they are called the **primary colors.**

Again, it is necessary to preserve the distinction between colored pigments and colored lights. So far as the classification of colored lights is concerned, opinions have altered from time to time as to what are the primary colors. Sir Isaac Newton called the entire seven colors primaries. Later Sir David Brewster performed experiments from which he concluded that red, yellow, and blue were the primaries. Then Professor Maxwell announced that the primaries are red, green, and blue, from direct examination of the light rays. Recent investigations have resulted in the conclusion that red, green, and violet are the simple, or primary, colors, so far as colored *lights* are concerned.

Certain modern color theories and systems that have been devised are not content with announcing other colors as primaries, but even attack the well-established classification of red, yellow, and blue as the primaries. The student must not allow these artificial color systems to confuse him. The matter as to whether the primaries red, yellow, and blue are to be used in their crude brilliant form, or in a subdued form, is a point that does not enter here; this will be discussed later.

The primary colors, red, yellow, and blue, are shown at the top of Fig. 1.

8. The Secondary Colors.—The secondary colors are those produced by a mixture, or union, of pigments of two primary colors. The union of the two primary colors, red and yellow, produces the secondary color **orange.** The union of the two primary colors, yellow and blue, produces the secondary color **green.** The union of the two primary colors, blue and red, produces the secondary color **violet.** Since there can be only these three combinations of the primary colors, there can be only three secondary colors, as described above; orange, green, and violet.

The secondary colors, orange, green, and violet, and the combinations that produce them, are shown in the second section from the top in Fig. 1.

9. The Tertiary Colors.—The tertiary colors are those produced by a mixture of pigments of two secondary colors. The two secondary colors, orange and green, produce **citrine.** The two secondary colors, orange and violet, produce **russet.** The other two secondary colors, violet and green, produce **olive.**

The tertiary colors, citrine, russet, and olive, and the combinations that produce them, are shown in the third section from the top in Fig. 1.

10. The Color Grays.—When two or more tertiary colors (each composed of secondaries, which in turn are composed of primaries) are mixed together, the result is known as a **color gray.** It is called color gray to distinguish it from neutral gray, which is a mixture of black pigment and water. No individual color names have been assigned to these color grays, because, on account of the varying proportions of each tertiary that may be used in their mixture, no two attempts at a certain gray ever result the same.

Examples of the grays that result when the tertiaries are mixed are shown in the bottom section in Fig. 1. For instance, if the tertiaries citrine and olive are mixed, a sort of cool gray results, as shown in the third row from the bottom. If the tertiaries citrine and russet are mixed, a sort of dark tan results, as shown in the second row from the bottom. If the tertiaries

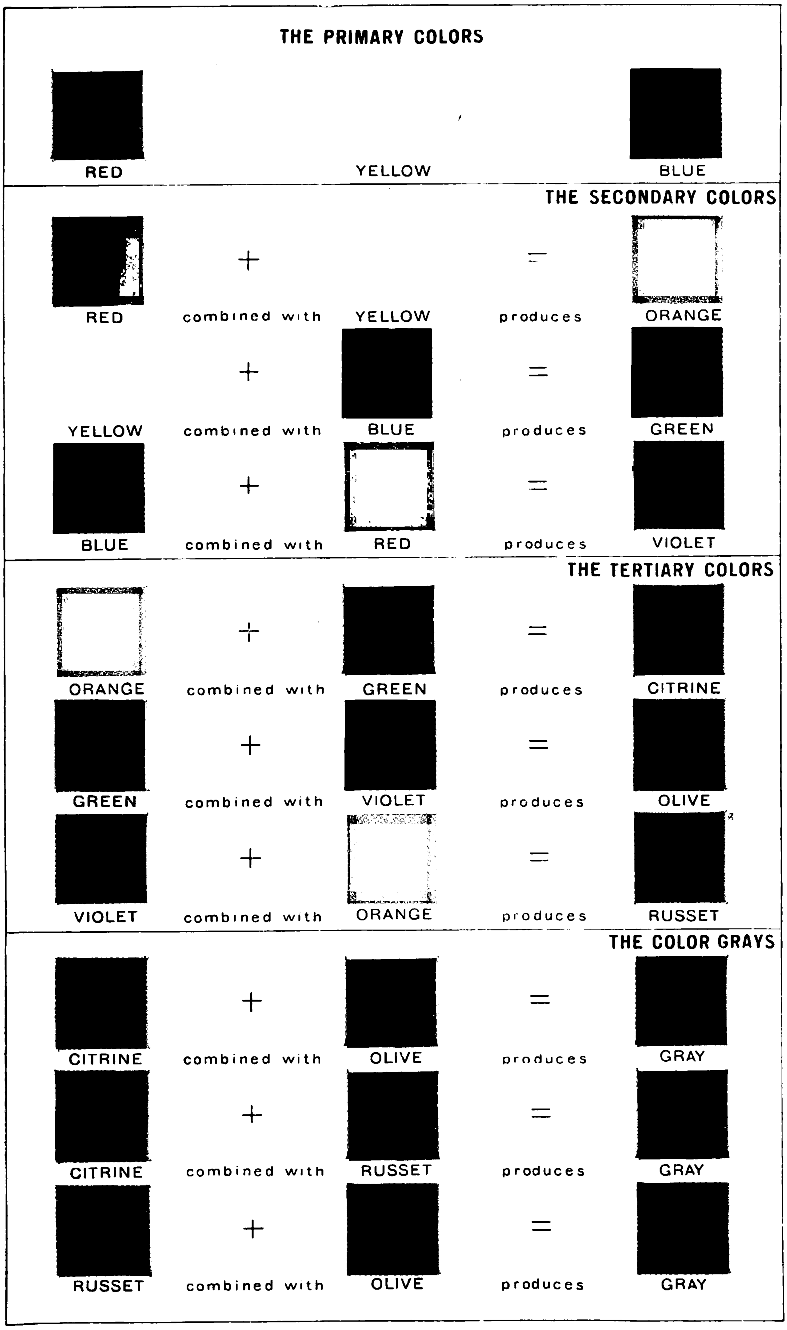
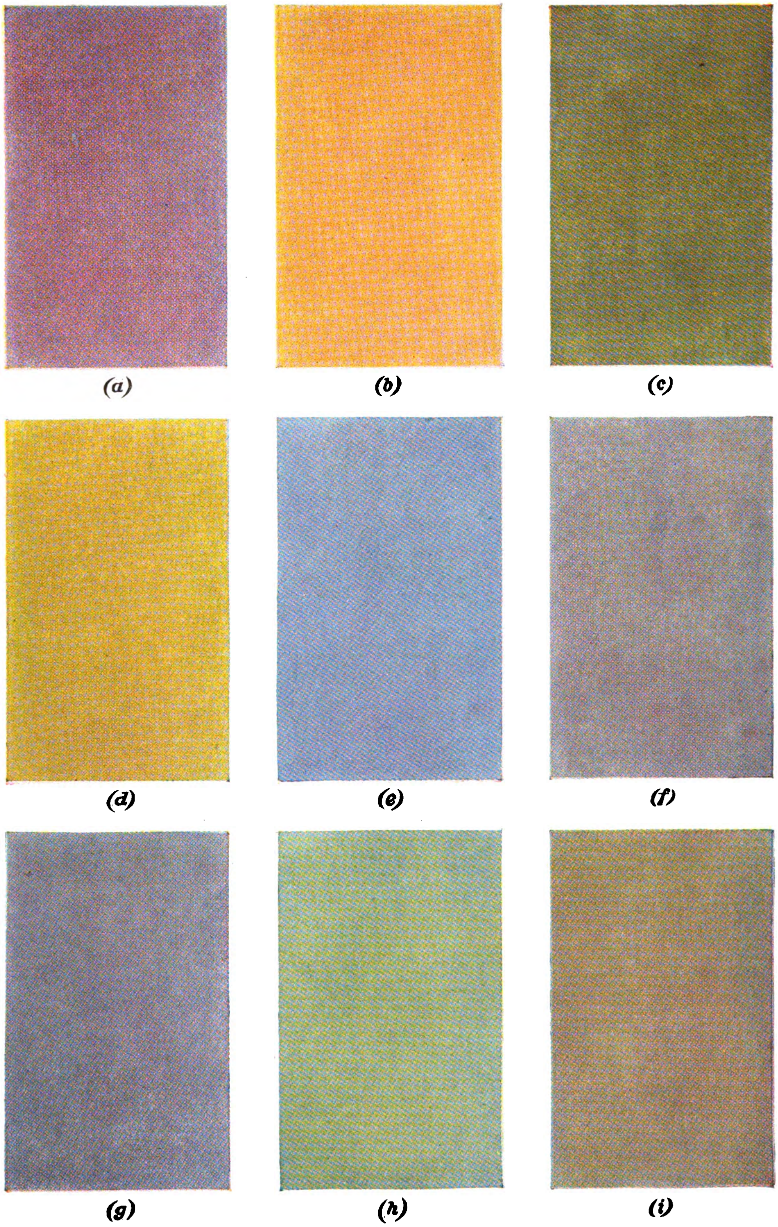

THE PRIMARY COLORS
RED
YELLOW
BLUE
THE SECONDARY COLORS
RED + combined with YELLOW = produces ORANGE
YELLOW + combined with BLUE = produces GREEN
BLUE + combined with RED = produces VIOLET
THE TERTIARY COLORS
ORANGE + combined with GREEN = produces CITRINE
GREEN + combined with VIOLET = produces OLIVE
VIOLET + combined with ORANGE = produces RUSSET
THE COLOR GRAYS
CITRINE + combined with OLIVE = produces GRAY
CITRINE + combined with RUSSET = produces GRAY
RUSSET + combined with OLIVE = produces GRAY

FIG. 1


(a) (b) (c)

(d) (e) (f)

(g) (h) (i)

Fig. 2

russet and olive are mixed they produce a warm tan color, as shown in the bottom row. While each of these three results is undoubtedly a color, yet it is referred to as a **color gray.**

In Fig. 2 (*a*) to (*i*) are shown additional examples of color grays. The gray in (*a*) was produced by mixing crimson, new blue, and yellow ocher; the one in (*b*), by orange and green; the one in (*c*), by burnt sienna and blue; that in (*d*), by gamboge, blue, and crimson; that in (*e*), by new blue and orange; that in (*f*), by burnt sienna and new blue; the one in (*g*), by gamboge, new blue, and crimson; the one in (*h*), by crimson and green; and the one in (*i*), by Vandyke brown and green. As the student proceeds further in this Section and becomes familiar with water-color pigments and their use, he will obtain practice in the manipulation of the pigments so as to produce luminous color grays.

THE THREE ELEMENTS OF COLOR

11. Value, Hue, and Intensity.—Each individual color of the primaries, secondaries, and tertiaries possesses three well-defined elements, or properties: **value, hue,** and **intensity.** This triple division is possessed by everything that has color; and unless one can name the gradation of value, the explicit hue, and the proportion of intensity of that color, not only does he himself not have a clear idea of the exact nature of that color, but he cannot describe that color to some one else, nor can he place that color upon paper or canvas by means of pigments.

12. Mechanical Measurement of Value, Hue, and Intensity.— The uncertain, "hit-or-miss" method of measuring relative amounts of color was long ago abandoned. It is now possible to obtain accurate measurements of color value, color hue, and color intensity by means of certain definite pieces of apparatus, charts, color standards, etc., just as one can measure meter and rhythm in music. One such piece of apparatus resembles a sphere, turning on a vertical rod. The north pole, or top of the central rod, represents pure white, and the south pole, the base of the rod, represents black, the nine gradations along the rod, from top to bottom, being by progressive steps from white to black. The horizontal circles drawn on the spheres, corresponding to the circles of latitude on a geographical sphere, represent horizontal cutting planes or disks of color corresponding in black-and-white values to the graded values on the central rod. The degrees of intensity of each color are then reckoned by the distance of any part of the disk from the central supporting rod. By this device the value, hue, and intensity of any color can be calculated with great accuracy. Other devices, in this particular color system, assist in accurate color notation and color measurement.

For the average student of color that is to be used in practical work, these extremely accurate mechanical methods of securing color measurements are impracticable and not necessary; and in this treatise only the general results of such color notation and measurement will be given. However, should any student desire to go into detail in studying such a color system, suggestions will be given, upon request, as to how to pursue this system, and how to secure and use the books, charts, scales, etc., of the system.

VALUE

13. Meaning of Value.—The term **value** is used to describe the different amounts of light and dark in a scene in nature, a painting, or a design. In nature, these black-and-white values range from the most brilliant white, as of snow in the sunlight, down through the most subtle gradations of light gray, gray, darks, etc., to the most intense black, as that of a dark night or the deep interior of a cave. But the limitations of pigments are such that neither the brilliant whites nor the intense blacks of nature can be painted. However, it is necessary to establish some sort of a scale of comparative values to serve as a standard with which other values and colors may be compared. Such a scale, made up of nine white, gray, and black squares, is shown in the middle column in Fig. 3. For convenience in referring to them, these gradations, running from top to bottom, are known as *white*, *high light*, *low light*, *medium*, *high dark*, *dark*, *low dark*, and *black*. These values are

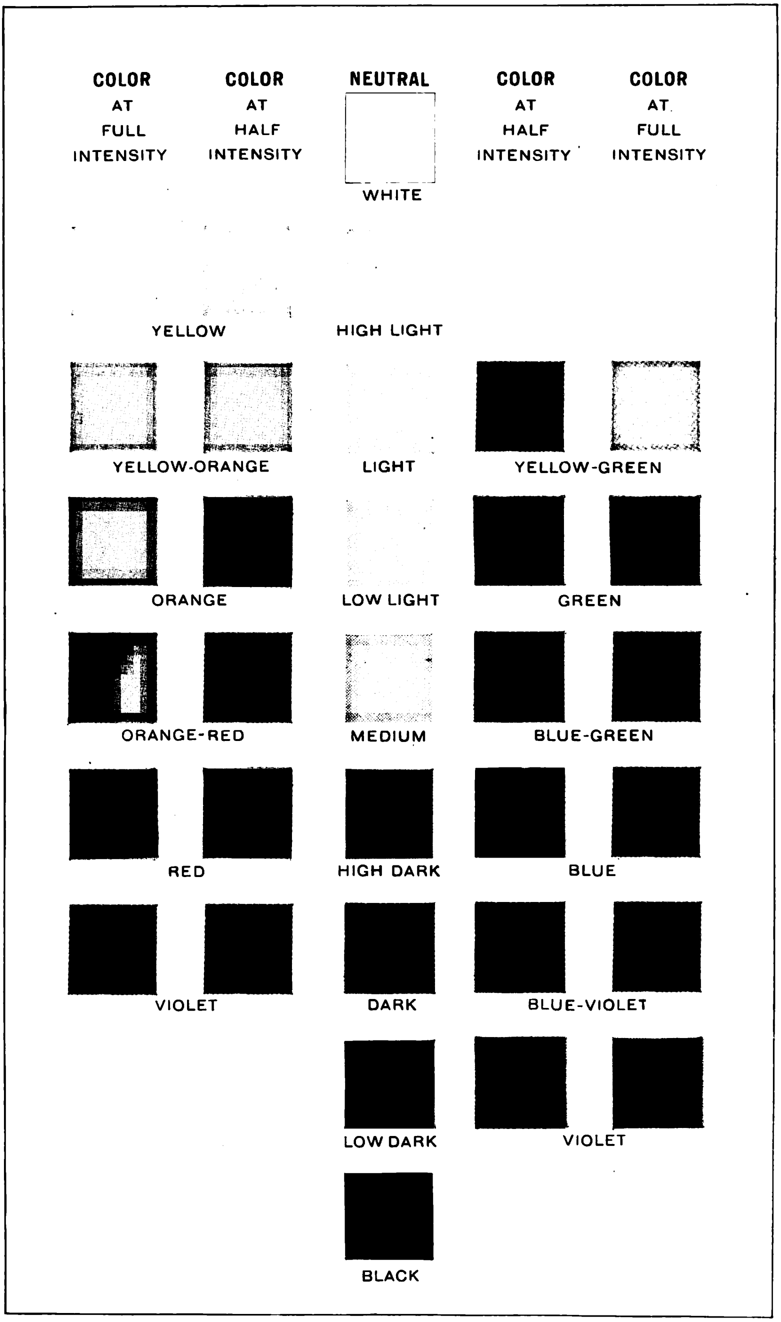
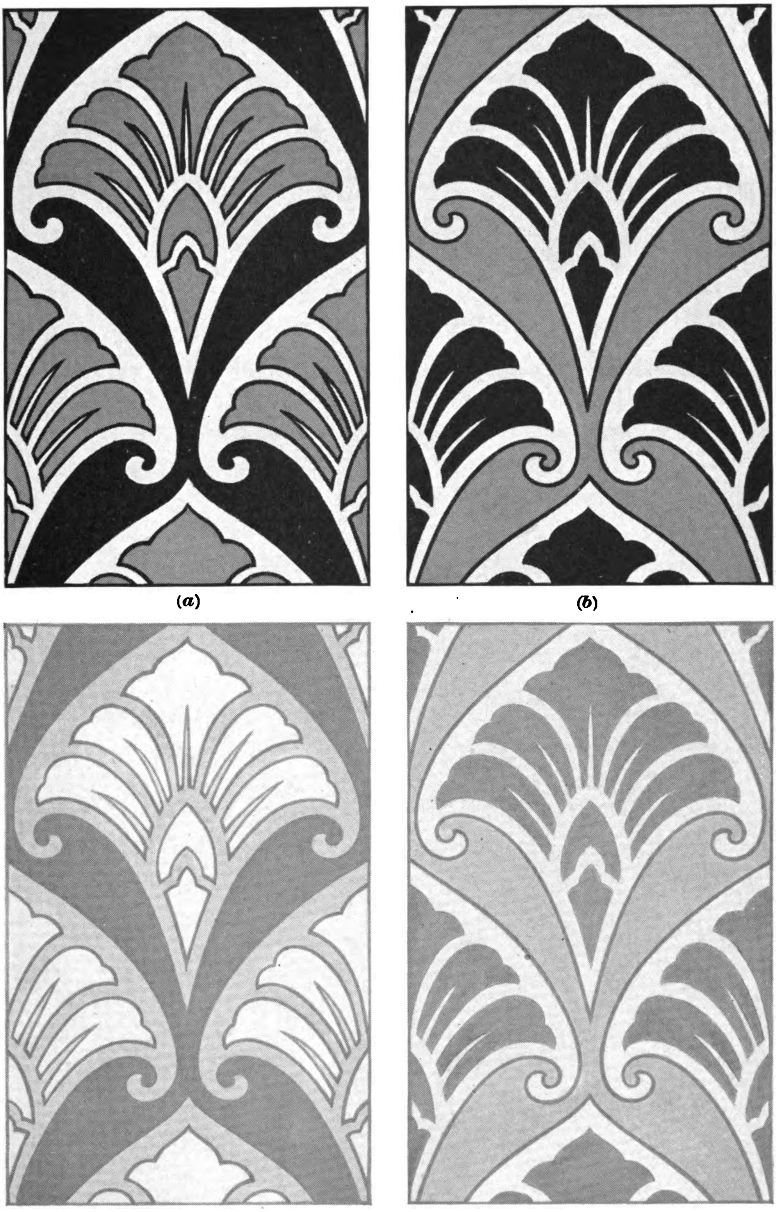

COLOR AT FULL INTENSITY
COLOR AT HALF INTENSITY
NEUTRAL
WHITE
COLOR AT HALF INTENSITY
COLOR AT FULL INTENSITY
YELLOW
HIGH LIGHT
YELLOW-ORANGE
LIGHT
YELLOW-GREEN
ORANGE
LOW LIGHT
GREEN
ORANGE-RED
MEDIUM
BLUE-GREEN
RED
HIGH DARK
BLUE
VIOLET
DARK
BLUE-VIOLET
LOW DARK
VIOLET
BLACK

Fig. 3



(a) (b)

(c) (d)

FIG. 4

equidistant in scale from one another. There are many minor gradations between black and white, as actually observable in nature; but, for the limitations of actual pigments and for the needs in pictorial or decorative work, the nine gradations shown in Fig. 3 are sufficient for all practical purposes. The values of this scale should be committed to memory so that the powers of observation may be increased and the ability be acquired to make sharp discriminations in the black-and-white tone values of everything that comes in the view.

14. Use of Black-and-White Values in Designs.—The chief object in becoming familiar with black-and-white value gradations is that they may be used in designs.

In Fig. 4 (*a*) to (*d*) are shown various methods of using certain values from the scale to get different effects with the same design. For the designs in (*a*) and (*b*) the values selected from the scale are **white, medium,** and **black.** In (*a*) **white** is used only for the small background portions of the palmette-shaped device. **Medium** is used for the larger portions of the palmette shape; and **black** is used for the main background, and for the outlining of the portions rendered in *medium.* In (*b*) the scheme is reversed from that shown in (*a*), just like the "other side" of a reversible rug or drapery. *White* is used, as before, only for the small background portions of the palmette shape; but *medium* in this case is used for the main background; and *black* is used for the larger portions of the palmette shape. Other arrangements of *white, medium,* and *black* could be made for the rendering of this same design, thus showing the diversity of forms of treatment possible.

A more harmonious treatment, however, is shown in (*c*) and (*d*), by using values that are closer together in the scale, namely, *high light, light,* and *medium.* In (*c*), *high light* is used for the forms of the palmette, *light* for the background of the palmette, and *medium* for the main background and for the outlining. In (*d*), *high light* is used for the background of the palmette, *light* for the main background, and *medium* for the palmette. By careful inspection the student should see why (*c*) and (*d*) are better than (*a*) and (*b*).

HUE

15. Meaning of Hue.—The term **hue** is applied to that element of color that essentially characterizes it as the color associated with its name. Hue is the element of any color that characterizes it as a color instead of a black-and-white value. The image seen on the ground glass of a camera shows the landscape, the floral group, or whatever it is, just as it looks to the eye; that is, with all its colors and its light and dark values. But the photographic print of the very same landscape or floral group shows everything in the picture in only black-and-white values. That which appears on the ground glass but is absent from the photographic print is *hue*.

16. Standard Hues.—The actual colors in nature, and the ones in pigment form as considered so far, are the spectrum colors, violet, indigo, blue, green, yellow, orange, and red. These colors, to be properly classified and compared with the scale of values, must be rearranged, and certain eliminations and modifications must be made. The color indigo may be eliminated as not being needed in average practical work. Six colors thus remain; but, to make a more complete set of colors, there must be considered a color coming in between each two main colors and tinged slightly with portions of each adjoining color. Thus, in making the step from red to orange there is a half-way color that may be called orange-red, because it is tinged both by red and by orange. Upon this basis, therefore, the main hues may be considered as being *red*, *orange-red*, *orange*, *yellow-orange*, *yellow*, *yellow-green*, *green*, *blue-green*, *blue*, *blue-violet*, *violet*, *red-violet*.

17. Colors Related to the Value Scale.—It has been shown that it is not only in the case of black-and-white objects that values exist. Colors also have values of different gradations; and unless one can recognize and use these values, his color knowledge benefits him little. In looking over the examples of the spectrum colors so far considered it is found that some hues are lighter than others; that is, they approach more closely to pure white, while others are darker, or approach

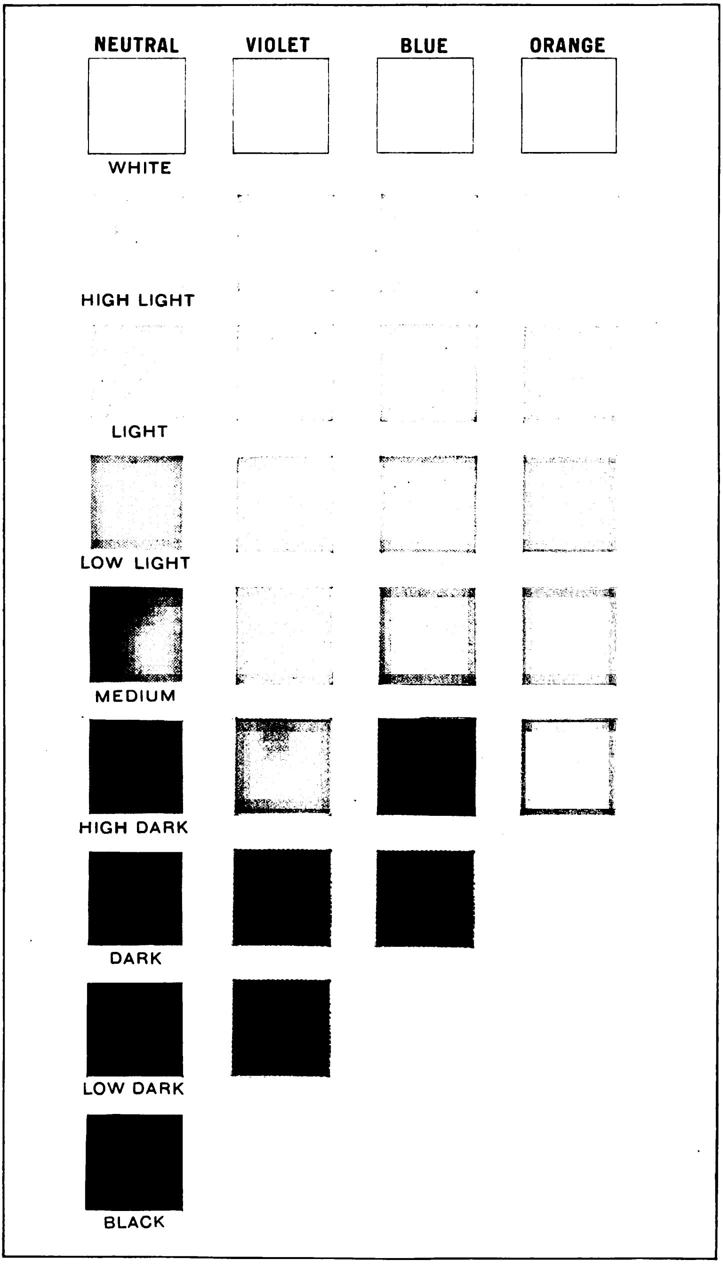

NEUTRAL
VIOLET
BLUE
ORANGE
WHITE
HIGH LIGHT
LIGHT
LOW LIGHT
MEDIUM
HIGH DARK
DARK
LOW DARK
BLACK

FIG. 5

more nearly to intense black. In Fig. 3 is shown a convenient classification and graphical arrangement, whereby each color is shown side by side with the particular black-and-white, or neutral, value that it matches in value. It is the full-intensity, or undimmed, colors that are referred to, and these are shown in the extreme left and the extreme right vertical rows.

The lightest color known is yellow, but it is not so light as *white* of the scale of neutral grays; it corresponds to *high light* of the same horizontal level in Fig. 3. A color next in brightness to yellow is yellow-orange, which is placed opposite *light* of the neutral grays. Next comes orange, which corresponds to *low light*, then orange-red, which corresponds to *medium;* next red, which matches in value *high dark*, and then violet, which matches *dark*. On the left the color values do not go any lower. As will be seen in the row at the extreme right, there are other colors that match some of the neutral grays. While there is no other color besides yellow that is as light in value as *high light* of the neutral values, yet yellow-green corresponds to *light*. Green corresponds to *low light*, blue-green to *medium*, blue to *high dark*, and blue-violet to *dark*. The color that goes lowest in the black-and-white scale of values is violet, or purple, as it is called in commerce.

The graded scale of colors, as shown in Fig. 3, can be made only when the actual pigments are used as brilliant as possible. It must also be remembered that the limitations of printing relative hues and values by means of printing inks are such that absolute accuracy of relation cannot be secured. The hues and values, however, are shown with sufficient accuracy in Fig. 3 to make a usable chart.

18. The Value of any Selected Color.—Each color, when at its full strength, is found in only one value. However, each color may appear in different values. It used to be the fashion to refer to the lighter values of a color as "tints," and the darker values of the same color as "shades," but this is hardly accurate. These differences in values must be classified as *high light*, *light*, *low light*, *medium*, *high dark*, *dark*, and *low dark*. In Fig. 5 is shown how the hue known as violet may vary all the way from *high light* to *low dark*. A similar range of values, although not so great, will apply to any color except the very light ones like yellow, orange, etc.

INTENSITY

19. Meaning of Intensity.—A color is referred to as being at its full intensity when it is made as brilliant as possible. In the case of pigment colors, a color may be said to be at full intensity when it is taken clean and at full strength from the color box; that is, when just enough water has been mixed with the pigment to make it flow well when placed on the paper, so that it is neither too thick nor too thin. A color at full intensity is the exact opposite of a neutral gray of the same tone value. As a color loses intensity it approaches neutral gray; as a neutral gray loses its grayness and gains in color, it is approaching full intensity.

Intensity is best illustrated by referring again to Fig. 3. The outside vertical columns, left and right, show the colors at **full intensity**; that is, undimmed. In the second and fourth vertical columns, the colors are shown at **half intensity**, being so tinged with gray as to make them half way between the brilliancy of full intensity and the dullness or quietness of neutral gray. In Fig. 3, only full intensity and half intensity are shown, but it is quite possible to show the colors at more subtle gradations, such as one-fourth intensity, or even one-tenth intensity, but such subtle gradations are not needed in this connection.

COMPLEMENTARY COLORS

20. Meaning of Term Complementary Color.—The practical worker in color, whether for pictorial or for decorative purposes, will need to be familiar with colors as related to their complementary colors. **Complementary colors** are those that, by their union, will, theoretically, produce white. This applies in the case of colored light rays; but while it is impossible to produce pure white by a combination of pigments, yet a neutral gray can be produced by such a mixture, either

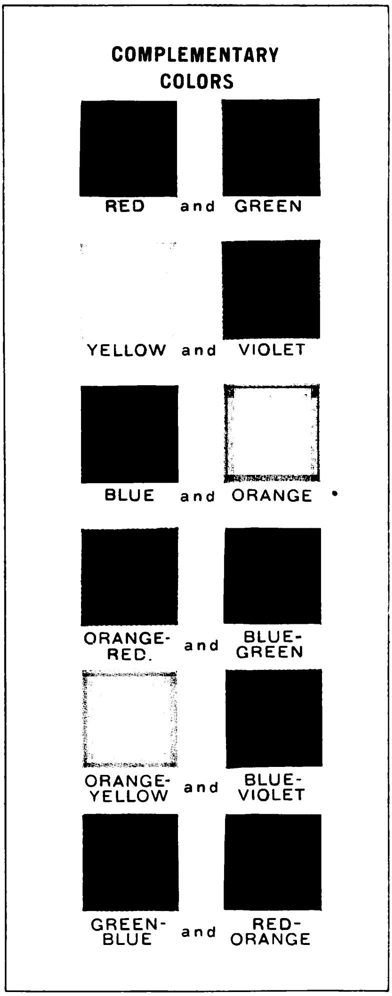

COMPLEMENTARY COLORS
RED and GREEN
YELLOW and VIOLET
BLUE and ORANGE
ORANGE-RED. and BLUE-GREEN
ORANGE-YELLOW and BLUE-VIOLET
GREEN-BLUE and RED-ORANGE

FIG. 6

as primaries or as secondaries. Thus, each secondary color becomes the complementary of the primary color that does not appear in its own make-up; for by mixing any secondary color with its opposite primary there are employed the elements that go to make up all the colors of the spectrum.

21. Examples of Complementary Colors.—In Fig. 6 are shown, in six horizontal rows, examples of complementary colors. These colors are complementary for the reasons given below:

In the first row, green is the complementary of red, because green, being made up of yellow and blue, represents the complement, or remainder, of the three primary colors, red, yellow, and blue, that go to make up the spectrum.

In the second row, violet is the complementary of yellow, because violet, being made up of red and blue, represents the complement, or remainder, of the three primary colors, red, yellow, and blue, that go to make up the spectrum.

In the third row, orange is the complementary of blue, because orange, being made up of red and yellow, represents the complement, or remainder, of the three primary colors, red, yellow, and blue, that go to make up the spectrum.

In the fourth row, orange-red is the complementary of blue-green, because the red, the complementary of green, in the first color is tinged with orange, which is the complementary of blue, the modifying hue in the second color.

In the fifth row, orange-yellow is the complementary of blue-violet, because yellow, the complementary of violet, in the first color is tinged with orange, which is the complementary of blue, the modifying hue in the second color.

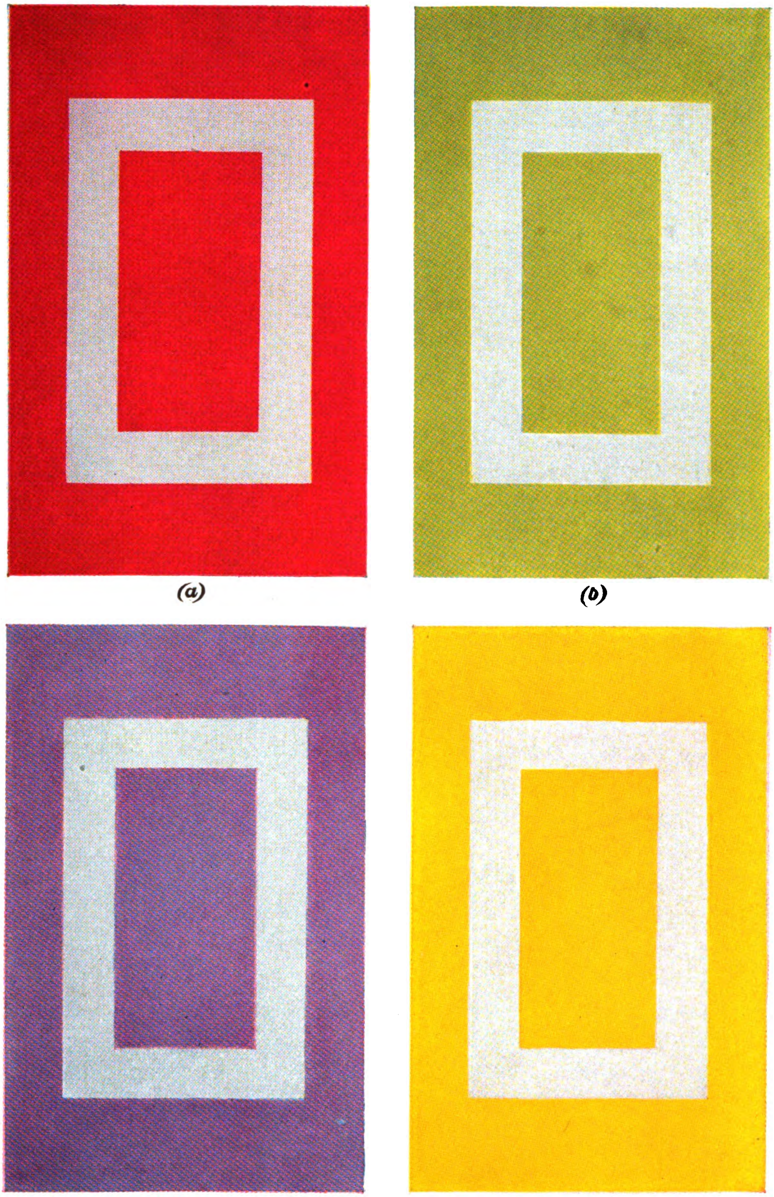
In the sixth row, green-blue is the complementary of red-orange, because blue, the complementary of orange, in the first color is tinged with green, which is the complementary of red, the modifying hue in the second color.

The list of complementary colors could be extended, and the complementaries of each hue determined as above. However, enough have been described and illustrated to show how complementary colors are determined.

SIMULTANEOUS CONTRAST

22. Simultaneous Contrast With Gray.—The term **contrast** is applied to the effect produced when a color and a gray (a hue and a neutral value), or two or more colors, or two different values, hues, or intensities of the same color, are placed next to each other. There may be contrast of value, contrast of hue, or contrast of intensity, each of which can be readily recognized or arranged by one who has become familiar with value, hue, and intensity. One of the most interesting forms of contrast is termed **simultaneous contrast.**

The first form of simultaneous contrast is that where a color is contrasted with a neutral gray. When a positive color; that is, a standard hue of full intensity, is placed next to a neutral gray, the effect on the retina of the eye is such that the neutral gray becomes tinged *with the complementary color* of the adjoining hue of full intensity. For instance, when a red is placed next to, or surrounding, a gray, the gray appears tinged with green, green being the complementary color of red. This is illustrated in Fig. 7 (*a*), (*b*), (*c*), and (*d*), where four rectangles of neutral gray are surrounded by four colors of full intensity, each of which appears to add a color hue to the gray to a certain extent. This change to color may not be apparent at first, but a careful study of the four rectangles will show a difference; and by closing the eyes slightly or viewing the rectangles through a piece of tissue paper, the decided hue of the complementary color will make itself apparent. Thus, the gray rectangle surrounded by red has a tinge of green when compared with the others, while that on the violet appears lighter and somewhat yellow. The gray rectangle on the green appears tinged with a red, while that on the yellow appears decidedly darker and tinged with a reddish blue, or violet. It is difficult for the average beginner to realize that the grays of the four rectangles are of exactly the same tone value and hue, and that this apparent difference in color is simply effected by the force of contrast. The student must not simply take this statement for granted, but must prove to himself its accuracy by making the inspections and tests recommended.



(a) (b) (c) (d)

FIG. 7

23. Simultaneous Contrast Between Colors.—In the same manner as with the gray, there can be simultaneous contrast between two colors; thus, when blue and orange are placed next to each other, the blue affects the orange with an orange tinge that is much brighter and more intense than the orange itself; and there is both an increase in light and a contrast of hue. The orange, on the other hand, tinges the blue with a more intense blue, and a mutual increase in brilliancy is the result.

This explanation of simultaneous contrast is given, not merely as an interesting property of color, but to prepare the designer to use the proper colors when coloring designs, etc. For instance, the shaded parts of an object, as well as the shadow cast by it, are parts that receive very little illumination. To the untrained observer they may appear a neutral gray; but, after the beginner's color observation has been trained, he can see that these shaded portions and shadows become tinged with the complementary of the adjacent positive color, which is an effect of the law of simultaneous contrast. For example, a shadow cast on a stretch of green grass appears tinged with a reddish hue, red being the complementary of green. The designer who wants to be a good colorist must understand this principle of simultaneous contrast between colors and apply it when doing the coloring even of conventional decorative work.

SUBDUED OR GRAYED COLORS

24. Reasons for Use of Subdued Colors in Design Work.—The observant student of design work, who also keeps in touch with pictorial work, will note that the best illustrators and designers who work in color do not use crude, glaring colors, but use ones that are subdued or grayed. The reason for this is that the true artist does not violate conditions that exist in nature; and the necessity for care and thought on this point applies to color as much as to any other feature. Similarly, the artist-designer must conform to the colors of nature when planning color schemes for his designs.

While colored lights and colored pigments may be very brilliant; that is, may be at the fullest intensity, such intensity is very rarely seen in nature. Because one knows that a certain poppy or a certain rose is red, he is not warranted in using only crude vermilion or crimson paint from the color box to paint a study of the poppy or the rose. A careful inspection of the flower will reveal that there is considerable blue or purple in it, due probably to the flower being in shade or to the peculiar grain or texture of the petals of the flower, or to some other cause. Any color in nature that is ordinarily considered as a brilliant color, will be found, upon examination, to be grayed. What is ordinarily judged to be the brilliant blue of a summer sky is really a grayed blue on account of the particles of dust in the atmosphere; the supposedly brilliant yellow-green field in the distance, even though in bright sunlight, is not bright yellow at all, but a grayish yellow, due also to atmospheric conditions. Thus, every so-called brilliant color in nature will be found to be grayed or subdued to some extent.

25. Securing Proper Hues.—To secure the proper grayed hues in color schemes, the principles of intensity, half intensity, etc., as previously discussed and illustrated, must be applied. There are two extremes to be avoided: first, the use of crude, glaring, brilliant colors; and, second, the use of colors that have been subdued and grayed so much as to take away from them all brightness and warmth, thus resulting in a mere artistic affectation. While it is true that one is obliged to work with pigments that are brilliant and sometimes almost crude, when he comes to use this color theory and these pigments he must secure the same effects of subduing and graying that are shown in nature.

The designer must therefore avoid crude, brilliant color schemes, and harsh and sharp contrasts of color, not because of any artistic affectation, but that his schemes may be *natural*, in the fullest meaning of that word. If this general principle is borne in mind, the young designer will not need to burden or confuse himself with any theories or systems of grayed or subdued colors, such as are advanced from time to time. Such

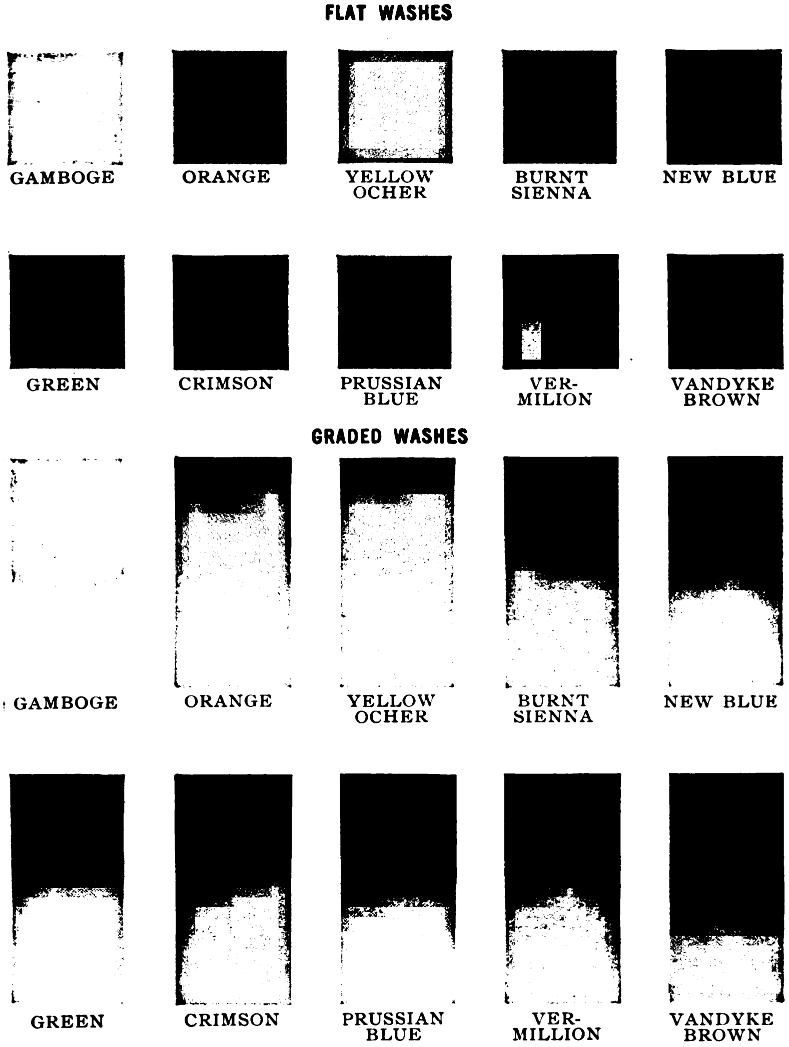

FLAT WASHES
GAMBOGE
ORANGE
YELLOW OCHER
BURNT SIENNA
NEW BLUE
GREEN
CRIMSON
PRUSSIAN BLUE
VER-MILION
VANDYKE BROWN
GRADED WASHES
GAMBOGE
ORANGE
YELLOW OCHER
BURNT SIENNA
NEW BLUE
GREEN
CRIMSON
PRUSSIAN BLUE
VER-MILLION
VANDYKE BROWN

Fig. 8

making full-strength strokes on a piece of white paper, and then comparing them with the colors in Fig. 8, and thus identifying each pigment. If the pigments are not already arranged in the color box in the order given above, they should be so arranged, so that they can be readily referred to when needed, without the process of repeating the identification in each case.

28. **Brushes.**—Three brushes will be sufficient to do the required work in this Section; one No. 6 red sable water color brush for large washes, one No. 3 for small details, and a small bristle brush for softening edges, etc.

29. **Paper.**—Whatman's cold-pressed white drawing paper, sometimes called water color paper, should be used; or a sketching block, or tablet, consisting of a pad of small size sheets of water color paper bound together at three sides, may be used, thus saving the trouble of stretching the paper. If the beginner does not have on hand a supply of paper from work on previous subjects, he should at once secure the necessary paper, so as not to be delayed in his work.

30. **Additional Materials.**—Certain other materials will be found useful, such as drawing pencils, sharp knife, water glasses, sponges, large white blotters, and clean white absorbent rags.

31. **Care of Brushes, Pigments, and Color Box.** Even though materials and tools of the highest quality and most suitable for the work to be done are procured, it will be only a matter of a few days until they are useless, unless they are properly cared for. Therefore, the following advice on the care of tools and materials is of importance:

Brushes.—Every care must be taken to keep the hairs of the brush coming to a point. To this end the brush should never rest on its tip, either in water or out of it, for this destroys the tip, which means the destruction of the brush. The point of the brush should not touch anything except the paint and the paper, and then only when in use. When removing paints from the pans in the color box, the brush, well moistened, should be placed in the middle of the pan and drawn backwards—*never* pushed forwards—in withdrawing the paint from the pan. The brush should never be kept standing in water, for the hairs will thus be loosened.

After using it, the brush should be thoroughly cleansed with clear water and wiped dry with a cloth, the hairs being brought to a point and allowed to dry that way. When brushes are not in use they should be placed in a jar so that they rest on their handles, and kept in an upright position.

Pigments and Color Box.—The tendency of beginners in water-color work is to neglect to keep their paints and color boxes clean. Water-color work to be worth while must give evidences of freshness and purity; any suggestion of muddiness in a study spoils it at once. Such freshness and purity can come only from colors and a color box pure and clean.

Streaks of different colors all run together into a muddiness that may seem artistic to some beginners, but prevents successful painting, must be avoided. The compartments of the color box and all places where color mixing has been done must be washed clean with clear water and a sponge. The various pans of pigments must themselves be cleansed of any foreign pigments that may have become mixed therewith. This should be done regularly after each time the colors are used.

Colors should be moistened by a few drops of water to keep them in good condition, and the color box, when not in use, should be kept tightly closed to keep out dust and dirt.

32. Stretching or Mounting Paper.—When sheets of water-color paper are used for making the charts and designs in color, the best results can be secured if the paper is properly stretched or mounted on the drawing board. The process is as follows:

Obtain some good library paste, a small brush, sponge, water, and a dry cloth. Be sure that your drawing board is perfectly clean and free from oiliness. Lay the paper, "right" side up, on the board. The "right" side of any water-marked paper is that which is toward you when you can read the water mark in its proper sequence of letters. Turn up an edge about $\frac{3}{8}$ inch or $\frac{1}{2}$ inch wide all around the four sides of the paper, so that the paper resembles a large flat dish or tray with a raised edge. Now reverse the paper so that the "wrong" side will be up, the paper resting with its folded edges (reversed) touching the board. Apply the paste with a brush to these folded edges, so that the paste is on the "wrong" side of the paper, and then go quickly over the paper with a wet sponge, taking care not to touch the paste. Then reverse the paper so that the "right" side will be up, and smooth it from the center toward the edges with a dry cloth, pressing down the pasted edges until they are sufficiently dry to adhere to the board at every point. The surface may now also be moistened with the damp sponge. If the edge of the paper does not adhere tightly at certain places when the paper and paste are still moist, several thumbtacks should be placed at these points. Lay the board flat and give the paper time to dry by evaporation; do not try to "hurry" it by placing it in the heat, for this will probably cause the paste to crack loose from the drawing board. The paper will at first look wrinkled and spoiled, but will soon dry and be perfectly smooth.

The paper may be removed, after the painting is completed, by running a flat knife blade under the edge and thus "cracking off" the pasted edge; or a knife point may be used to cut the paper free from the board, leaving the pasted edge remaining, this pasted edge afterwards being removed by soaking it with hot water and then scraping with a knife.

33. Practice in Laying Flat Washes.—The ability to lay a flat wash is of such importance for design work in color that practice in such work is necessary.

On a sheet of Whatman's cold-pressed drawing paper (water-color paper) one-half full size; namely, about 15¼ in. × 9⅞ in., lay out a diagram in pencil outline, as shown at the top in Fig. 8. Make the ten squares on the upper part of the sheet 1 inch on each side, and the ten rectangles below them 1 inch wide and 2 inches long. Beginning with the upper left-hand corner, lay on a flat wash of color in each square with a No. 6 brush well charged with color from the color pan. The color should not be a thin wash, but should be thick and creamy, but not full of air bubbles, and should be as nearly full strength as possible without becoming too bulky to handle. It must be thick enough to give its full strength and value on the white paper, and thin enough to wash evenly over the surface. It should be tried on a separate piece of paper before being applied to the diagram. With a brush full of gamboge pigment of the above described consistency, the square in the upper left-hand corner should be washed in, keeping the edges as true as possible, and using the brush on its side so as to make broad marks rather than a series of fine ones. Keep a generous pool of color in front of the brush, and work it toward the lower edge by slightly tilting the board. When the square has been washed completely full, and the sides and edges trued up nicely, the color should be removed from the brush by drawing it across a piece of white blotting paper, and the pool of superfluous color in the corner or bottom edge of the square should be lifted off by touching to it the partly dried brush, thus absorbing the excess color into the brush, which may again be dried on a blotter. This will make the wash of color flat and even all over the square.

The other squares in the upper part of the sheet should be similarly washed in, each with its proper color, care being taken to keep them uniform in quantity of wash and in tone value, and positive in color. Do not allow any one color to remain in the brush when it is recharged with another color; wash the brush thoroughly before each charge of color, and use perfectly clean water for the mixing of all these colors, so that none of them may become contaminated. The colors should be washed in on the ten squares at the top, in the order shown at the top in Fig. 8. By this time the student will have experimented with and identified the colors in his color box, as previously directed, and there need be no difficulty experienced in knowing what the various pigments are and what colors they produce when washed onto the paper.

When a flat wash of color is to be placed around details in a design, a smaller and more pointed brush must be used, but the general method of working is as described. As before, the board must be tilted, and the general washing in so planned that there is always an available space somewhere farther down on the paper into which the advancing pool of wash may be pushed or allowed to flow. Again, careful planning is required to see that, if small washes are started at two or more separate places on the background, they can be led together so as to meet in one large main pool of color that may then be continued, and the surplus pool removed as before.

34. Practice in Laying Graded Washes.—It will sometimes be necessary even in coloring surface patterns, and certainly in making sketches for designs for solids, to lay washes that grade from dark to light and from light to dark. Practice in laying such graded washes may be had as follows, as illustrated in the lower ten rectangles in Fig. 8:

Start with the gamboge in the upper left one of the two lower rows of rectangles. A wash of pure color, the same as that in the top left-hand square, should be painted down about $\frac{3}{4}$ inch; then the tip of the brush should be dipped into the water and the wash carried $\frac{1}{4}$ inch farther. This operation should be repeated until within a short distance of the bottom, the brush being gradually cleaned of the color, and water being added until the brush contains almost clear water, with which the space is finished. All surplus color must be removed from the bottom of the rectangle, as previously described, by lifting it off with a partly dried brush and then drying the brush on a blotter. Otherwise the pool of superfluous color will dry and make a dark spot. The purpose of such an exercise is to get a clean gradation from a pure color to a very light tint.

This exercise should then be practiced in the remaining nine rectangles with the other colors: orange, yellow ocher, burnt sienna, new blue, green, crimson, Prussian blue, vermilion, and Vandyke brown. The difficulty most commonly met with results from a too sudden jump from the pure color to a lighter value. This is especially noticeable in the darker colors, red, blue, and brown. The cause of this is usually the addition of too much water when first beginning to blend the colors; but, in general practice, if any of the washes are spoiled in this way, they may be removed from their rectangles by sponging

BLENDED COLORS

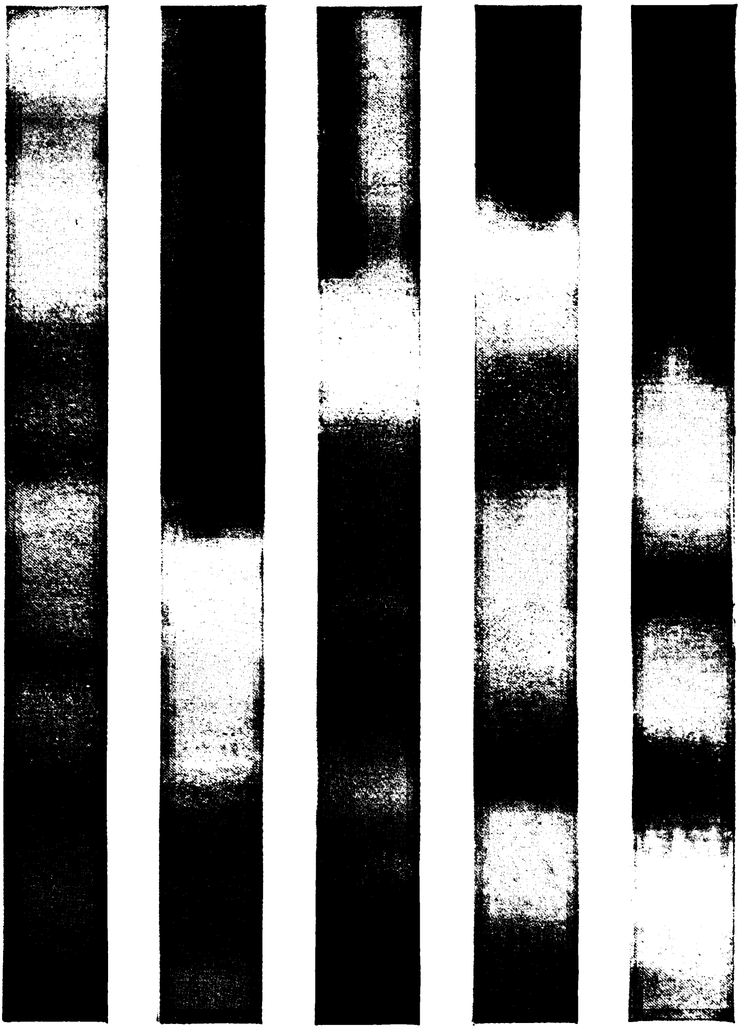


FIG. 9

COLOR MATCHING

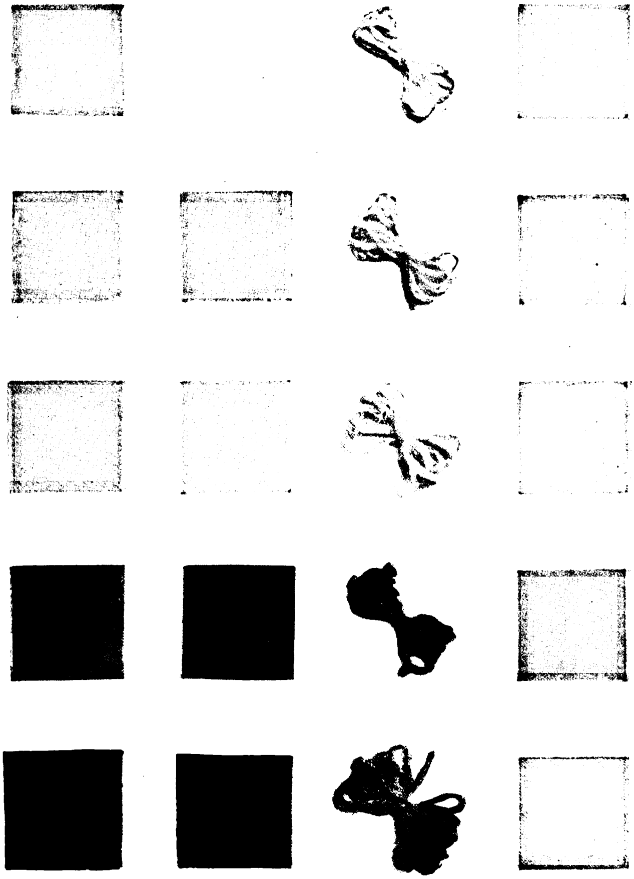


FIG. 10

them immediately with a soft sponge charged with plenty of cold water, and afterwards drying it and lifting off superfluous color and water with a white blotter. Another wash of color may then be laid on the place where the first one was, although it will likely be somewhat darker than the first one, as a certain amount of color will remain in the pores of the paper and contaminate the second wash when it is put on. The effects in this chart or diagram, as shown at the lower part of Fig. 8, must be produced by single graded washes as described above and not by a series of superimposed thin washes.

35. Practice in Blending Colors.—Just as the designer will need to know how to make graded washes of any one color, so occasion will arise where he will be called on to make washes of blended colors. The method of making such blendings is as follows, as illustrated in Fig. 9:

Lay out a diagram or chart where the five strips of color are about 1 inch wide and 10 inches long. Here each color is combined with each of the other nine colors contained in the color box. The blendings are not produced by the addition of water to the color but by flowing the pure wet colors together in the following manner: All of the colors should be moist and ready to work with by previously wetting their surfaces and stirring slightly with the point of the brush. A glass of clean water should be at hand for rinsing the brush, and when painting one of the columns of color the student must work from top to bottom continuously, without stopping for any purpose whatever.

Divide each column into about nineteen spaces, each of which will be a little over half an inch. Do *not* measure these spaces with a scale and draw lines; simply judge them by eye measurement. With the board slightly tilted and with a full brush of gamboge, lay on a wash of color covering the first space. While the pool of color remaining at the bottom of the first space is still wet, the brush should be rinsed quickly in clear water and the next lot of pure color, orange, should be taken onto the brush and applied to the lower edge of the pool of gamboge left standing at the bottom of the first space. The orange will blend softly in the second space with the pure gamboge and will leave a pool of mixed color at the bottom of the second space.

The addition of the second color will, of course, swell the pool to some extent so that some of it will have to be removed; otherwise, the mixed color will flow down too much and overwhelm the pure color below. A sufficient amount must be left, however, to make a soft blending. After the mixture has been made, the brush should be quickly rinsed and filled with pure orange and continued down two spaces more. After again rinsing the brush, the mixing operation should be proceeded with in the next space below, adding yellow ocher. This pure yellow ocher is to be afterwards blended into burnt sienna, and so on.

The following is the order in which the colors are applied in each of the columns:

Column 1	Column 2	Column 3	Column 4	Column 5
Gamboge	Orange	Yellow ocher	Burnt sienna	New blue
Orange	Burnt sienna	Green	Prussian blue	Vandyke brown
Yellow ocher	Green	Orange	Gamboge	Burnt sienna
Burnt sienna	Prussian blue	Gamboge	New blue	Vermilion
New blue	Vandyke brown	Burnt sienna	Crimson	Yellow ocher
Green	Gamboge	Crimson	Orange	Prussian blue
Crimson	Yellow ocher	Vandyke brown	Green	Orange
Prussian blue	New blue	Vermilion	Vandyke brown	Crimson
Vermilion	Crimson	New blue	Yellow ocher	Gamboge
Vandyke brown	Vermilion	Prussian blue	Crimson	Green

The errors usually made in this work are: first, the tendency to use color that is too weak, and second, the tendency to use too little pigment; thus, a hard, dry, patchy effect is the result. In blending a dark color into a light one, the beginner is likely to allow too much of the dark color to run down, thus covering the light color and entirely annihilating it. In practicing this work, endeavor to avoid any appearance of a horizontal line where the colors seem to blend. The addition of a little more of the pure color and tilting the board so as to allow it to flow downwards will obviate this difficulty.

Practice this exercise several times before attempting to prepare the final sheet and try to observe the differences in successful handling, where a light color is blended into a dark color and where a dark one is blended into a light one; also, where two colors of the same value are blended together. These blendings, as shown in Fig. 9, should represent the student's very best efforts, after having done a great deal of preliminary practice work.

One of the greatest advantages of practice in this work is the training that it gives in the mixing of colors on the paper instead of on the palette or the tray. A freshness and brilliancy of color is thus obtained that cannot be acquired in any other way.

PREPARING THE COLOR CHARTS

36. The purpose of the color charts in Figs. 1 to 7, inclusive, is to make clear the instruction given in the theory of color, and these illustrations serve as graphic examples of the principles discussed. Next, it is advisable to lay out these color charts and paint them in colors, so as to become familiar with the methods of securing various color effects with the pigments at hand.

37. The Chart of Primaries, Secondaries, Tertiaries, and Grays.—The student should now turn back to Fig. 1, and lay out on a 15"×10", or a (15¼"×9⅞"), sheet of paper the squares as shown, each 1 inch on a side, allowing 1 inch or 1¼ inches between the vertical rows and ¼ inch between the horizontal rows. There will thus be ten horizontal rows of three 1-inch squares each, as shown.

All the colors to be washed in are flat colors, and the actual laying of the colors should be done in exactly the same manner as described for the upper ten squares in Fig. 8.

To produce the primary red, use the pigment crimson full strength. To make the primary yellow, use the pigment gamboge, the lighter of the two yellow pigments in the box. To produce the primary blue, use the pigment new blue, the lighter of the two blue pigments in the box. To make the secondary orange, the pigment orange may be used, or crimson and gamboge, or vermilion and gamboge, may be mixed. To produce the secondary green, the pigment green may be used direct from the box, or gamboge and new blue may be mixed.

To make the secondary violet, the pigments crimson and new blue should be mixed. Indigo, a color not much used in color schemes, but listed as a spectrum color, may be produced by using the pigment Prussian blue, with which a little new blue is combined.

When it comes to producing the tertiaries and the color grays, none of them can be taken direct from the color pans, but must be mixed from other colors. When reference is made to *mixing* the colors to produce the tertiaries and the grays at the bottom of Fig. 1, it does not mean that the pigments are mixed in a dish or tray and applied as one wash. The best results are obtained by mixing the color more or less on the paper. In the separate compartments of the lid of the color box, or of the color tray, strong washes of each one of the component colors should be made. The brush should then be filled by dipping it successively in each one of the three colors without any stirring, and applying it boldly to the paper with a stroke sufficiently wide to show the color. It will be observed at once whether the color is of the desired depth. If too much of any one color is evident, dip the brush into one or another of the colors, as the case may require, and at once modify the color already applied, and so, renewing the colors frequently and taking care not to allow them to become too neutral by brushing, proceed until the desired area is covered. After gaining confidence through experience, it will be possible to work more directly from the pans of color.

Additional practice in making color grays should next be secured by laying out and coloring a chart such as shown in Fig. 2. This chart may be laid out on a 10″×15″ sheet of paper, each rectangle being 2½ inches wide by 3 inches high, with a space of ½ inch separating it from other rectangles. For the color gray shown in (*a*) the mixture should consist of crimson, new blue, and yellow ocher; for that in (*b*), orange and green should be used; for the one in (*c*), burnt sienna and blue; for that in (*d*), gamboge, blue, and crimson; for that in (*e*), new blue and orange; for that in (*f*), burnt sienna and new blue; for that in (*g*), gamboge, new blue, and crimson; for that in (*h*), crimson and green; and for the one in (*i*), Vandyke brown and green should be used. The student need not expect to get the exact hues as shown in Fig. 2; for no two color renderers will produce the same effect with a mixture of any given number of definite colors, because the proportion of each color used cannot be the same in any two cases. Furthermore, water-color pigments on water-color paper give results different from printer's ink on book paper, and this difference will prevent the student from making his renderings of color grays exactly like those in Fig. 2; nor should he expect to be able to do so.

38. The Charts of Value, Hue, and Intensity.—In laying out the chart shown in Fig. 3, a 15″×10″ (or 15¼″×9⅞″) sheet of paper may be used. Each square should be about 1 inch on a side with a space of about ½ inch separating it from adjoining squares. The middle vertical column of squares, nine in number, should be laid out first, on the vertical center line of the sheet. Next, the two vertical columns of six squares each should be laid out to the left of the central column, starting on a horizontal level with the second square from the top of the central column. Then, the two vertical columns of six squares each should be laid out to the right of the central column, starting on a horizontal level with the third square from the top of the central column. As before, each square is to be 1 inch on each side and ½ inch from adjoining squares.

In starting to fill the squares with the pigment, the black-and-white values ranging from pure white to black, in the central vertical column, should be put in first, charcoal-gray water-color pigment being used for the purpose. Of course no wash need be placed in the top square, because the pure white of the paper will be used to show *white*. The best method of placing the graded values of charcoal-gray in the squares is as follows: First, wash in the bottom square with the pigment full strength; that is, black. Then, turn the paper upside down so that the black square is at the top. Now, by means of a wet brush, place some pure charcoal-gray pigment in the mixing tray and add a little water. Try a wash of the resulting pigment on the edge of a piece of white paper and, when dry, compare this wash with the one marked *low dark* in Fig. 3. If the resulting wash is too light, add a little more pigment until the resulting wash, when dry, will exactly match the one marked *low dark* in Fig. 3. Then wash in the *low dark* square in the chart. Next, add a few drops of water to the wash in the mixing pan; test on the edge of a piece of paper; compare with *dark* in Fig. 3; alter as before, if necessary, and then wash in the *dark* square in the chart. In a similar manner, keep adding water, testing, and washing in the other squares in the central vertical column, until squares *high dark*, *medium*, *low dark*, *light*, and *high light* have been successively washed in.

Several trials at washing in these graded black-and-white values may be necessary before the desired values are secured. After all are washed in and are dry they should be compared very carefully, value for value, with those in the central vertical column of Fig. 3.

The squares containing color may be washed in as shown, without any detailed directions being required. The various colors are all flat washes of the colors whose names appear under the squares, and the proper pigments to use for each color have already been pointed out. The practice gained in washing in the squares of color in the chart showing primaries, secondaries, tertiaries, and grays will enable the student to wash in all the colors of the chart in Fig. 3, starting with the *high light* color, gamboge, in the upper two squares in the left-hand columns, and ending with the *low dark* color, violet, in the lower two squares in the right-hand columns. Some colors, as gamboge, orange, etc., may be used pure from the color box; others will have to be mixed. Care must be observed to keep the *value* of each color corresponding exactly to the neutral gray (black-and-white) value opposite which it stands in the chart.

The colors in vertical columns one, two, four, and five are now at *full intensity*. Columns two and four must now be reduced to *half intensity* by adding a neutral gray to the colors therein. Washes of diluted charcoal-gray should therefore be placed over the colors in vertical columns two and four when these colors are thoroughly dry. The required depth of charcoal-gray wash for each color can be judged only by experiment.

Next, such a chart as shown in Fig. 5 should be laid out and painted. The squares are to be of the same size and distance apart as before; and the vertical column of neutral grays, the black-and-white values, should be carefully washed in as previously described. The squares of color, violet, blue, and orange, ranging from the full-strength color at the bottom to their lightest values at the top, can be washed in without any trouble. The principle under which the full-strength colors are gradually diluted by drops of water for successive squares is exactly the same as described for the scale of neutral grays in Fig. 3.

39. The Chart of Complementary Colors.—Although the printed chart of complementary colors shown in Fig. 6 shows exactly the hues of the various colors that are complementary, yet, in order to obtain practice in actually producing these companion colors, a chart should be prepared as follows:

Two vertical rows of 1-inch squares, six or more in each row, should be laid out as before, the vertical rows being about 1 inch or 1½ inches apart. In the upper left-hand square crimson, with a little touch of orange, should be washed in. In the upper right-hand square the green may be the green from the color box.

In the second square from the top, left-hand column, the yellow may be the gamboge direct from the color box, the corresponding square in the right-hand column being made of a mixture of crimson and new blue, so that neither the crimson nor the blue predominates, but that the result may be a pure violet.

In the third square from the top, left-hand column, the blue may be the new blue direct from the color box, the corresponding square in the right-hand column being made of the orange from the box.

In the fourth square from the top, left-hand column, the orange-red is made with crimson to which just enough orange has been added to make the red warm, but not to give it an orange hue; the corresponding square in the right-hand column is made of a mixture of green and new blue in which the green predominates, so as to produce a blue-green. Considerable care in handling the water colors is necessary in securing "tinged" colors.

In the fifth square from the top, left-hand column, the orange-yellow is made with gamboge to which enough orange has been added to give it an orange tinge; and the corresponding square in the right-hand column is made of a mixture of crimson and new blue in which the blue predominates, so as to produce a blue-violet.

In the sixth square from the top, left-hand column, the green-blue is made with a mixture of new blue and sufficient green to give the new blue a greenish tinge, the corresponding square in the right-hand column being made of orange to which enough crimson has been added to give the orange a red tinge without taking away entirely the orange hue.

COLOR MATCHING

40. Matching Colors of Fabrics and Materials.—In addition to preparing color charts with water-color pigments, and thus securing not only valuable practice in using colors, but also obtaining charts that are useful for reference, it is advisable to practice matching colors of fabrics and materials with water-color washes. The designer should always be able to match color accurately, for he is frequently called on to execute designs that call for the use of materials or fabrics having certain colors. Some persons have color perception developed to a greater degree than others, while a few persons possess no color perception whatever, and are said to be *color blind*. Color blindness is a very serious drawback to a designer and prevents his working, except in a very limited field. However, considerable practice is required to train the perceptive faculties of a person with normal eyesight so that he can readily detect what colors, and their hues, values and intensities, exist in a certain fabric before him.

41. In Fig. 10 is shown how such color matching may be done. In this case knots of colored yarns, pink, yellow, light blue, golden yellow, and bluish green, in the third vertical row from the left are tied through perforations in the paper. Instead of yarns, other materials, such as woolen or cotton goods, silk, velvet, etc., may be used. Then 1-inch squares should be laid out in a vertical row, as shown, to the right of the goods that have been pinned or pasted onto the paper. Water-color pigments should then be mixed and tested, and in this way each square will be filled with a color wash that will match, in value, hue, and intensity, the corresponding material pinned or pasted on the sheet.

This will necessitate frequent testing of the color on a separate piece of paper, and the addition thereto of other color until the required shade is attained. One must learn to see whether the color applied to these individual squares requires more blue, more yellow, or more red.

The desired mixture should be made with as few colors as possible, and when the proper tint is painted on a separate piece of paper and allowed to dry one can readily judge whether it is too light or too dark, too intense or too neutral, or whether it leans too much or too little toward some decided color.

Considerable practical experience is necessary to enable the designer to judge the amount of color necessary to prepare in any case, and the beginner usually wastes much material in this way, until his judgment is well trained. In mixing color to go over a certain space, it is always better to have too much than too little, as it is a tiresome and tedious job to have to match color, as is the case where one stops to mix more color because the supply has become exhausted.

The two vertical rows of colored squares at the left of Fig. 10 may be considered as places for testing colors, but when making the actual chart may be left off the sheet.

42. Effects of Artificial Light on Colors.—Colors can never be matched satisfactorily by artificial light, and it should be taken into consideration at all times in preparing a design that, although it may be designed and manufactured by daylight, it is likely to be seen in the finished fabric by gaslight or lamplight, under which circumstances its color values might be materially changed. Lamplight or gaslight varies from yellow to orange-yellow, and viewed under these conditions, colored materials will present exactly the same appearance as though their colors had been mixed with yellow-orange before they were applied to the paper. The yellows in the design become scarcely visible, and red and orange become materially heightened under the influence of the yellow light. The cold reds tending to purple lose their purplish hues, and the pure blues and those tending to violet become much more violet. The greenish blues, such as Antwerp blue, become still greener, and blue-violet is very much dulled in hue, while red-violet becomes slightly redder.

The yellows and blues seem to suffer most under yellow artificial light, as the yellow becomes entirely canceled or absorbed by a light of its own color, and the blue is largely neutralized by a light that is complementary to its hue. Therefore, one can see that it is practically impossible to match colors by artificial light.

COLOR HARMONY

SOURCES OF COLOR INSPIRATION

43. Necessity for Ability to Harmonize Colors.—It is of vast importance that the designer be able to work out a satisfactory color scheme in any of his designs, even though the manufacturer reserves the privilege of changing this color scheme to suit his own requirements. A good color scheme gives much personal satisfaction to the designer. It makes a good impression on the manufacturer to whom the design is submitted, and, consequently, may assist in its sale. No matter how satisfactory the original color scheme may be, the product will usually be reproduced with a number of color arrangements that are dictated by the experience of the color man in the factory.

The manufacturer's facilities for obtaining a variety of color schemes quickly are much greater than those of the designer. The wallpaper manufacturer can order his operator to touch his printing block to any particular slab of color, or to vary the color on that slab or in the troughs of his printing machine.

Or, the textile manufacturer can load his frames or his shuttles with different colors of yarn and try the effect of a pattern under different conditions, whereas the designer must work out his color scheme mentally and laboriously paint it on his pattern. Therefore, it behooves the designer to select for his pattern such a color scheme as will show his design to the best advantage, as it is difficult for him to work out more than one.

44. The Three Sources of Good Color Schemes.—The designer desiring to get up good color schemes for his work cannot expect to evolve harmonious colors "out of his head," as it were, without reference to some authoritative source, any more than he can evolve good designs without reference to some authoritative source.

There are three main sources from which to draw color inspiration: First, the scientific analysis of light, which is the source of all color, from which results the spectrum; second, various combinations of color seen in nature; and, third, the combinations of color that have been used throughout all ages in the best periods of decorative art. From these sources various rules have been deduced that give valuable aid in practical work. These rules not only help one to form intelligently and to judge his own color scheme, but they also give the key to the solution of numerous different color schemes for the same subject and assist him to decide which one to select.

45. Color Schemes From Analysis of Light.—In securing suggestions for color schemes from the analysis of light, various practical plans may be followed. The experiment may be tried of breaking up a ray of sunlight by letting it fall upon one of the faces of a glass prism, thus throwing the spectrum colors onto a screen, and note may be made of the beautiful resulting color harmonies. Another plan is to secure and look into a kaleidoscope. This is a toy that may be purchased at a department store or toy shop. It consists of an octagonal tube with a mirror in one end. On looking into the end opposite the mirror, and turning the tube, the pieces of glass fall into different positions, making various color combinations. Such a device is actually used by certain practical designers.

46. Color Schemes From Nature.—It is, of course, from nature that the most effective color schemes may be secured; and they may be had in endless variety. The colorist awake to his studies can see in every object before him combinations of lights and shades, hues and values, that in themselves are pleasing. Observe, for instance, the beautiful blending of color in the rainbow. The several spectrum colors are here softened by the atmosphere, modified from simple contrast, and blended one into the other to form a beautiful arch that is not harsh in any of its combinations, as the effect is softened by atmospheric influence. However, it is not with such brilliant subjects as this that the colorist is to deal in studying nature for color schemes. In all objects there is a range of color effects so varied that in two examples of the same subject separate ideas are found. In the sky, in the water reflecting the sky, in the earth and all vegetation growing therefrom, are found a myriad of forms and suggestions abundant in color that is wonderfully harmonious and wonderfully fit. While it seems scarcely necessary to enumerate the natural forms from which one might draw a color inspiration, a few of them are pointed out as follows: Flowers and leaves, fruits and vegetables, insects, such as butterflies, dragon flies, bees, etc., the plumage of birds, the coats of animals, shells, fish, metals, minerals of all kinds, and all articles that have been affected in color by age, action of the elements, or heat. Gold, silver, copper, brass, bronze, and steel furnish a multitude of suggestions for color schemes, particularly when color-tarnished, oxidized, or discolored through unequal heating. The same object will never produce exactly the same effect under similar conditions.

The success of a color scheme depends as much on the proportion as on the combination, and in changing a scheme of color from nature that is particularly pleasing, one must be able to estimate, as nearly as possible, the proportions in which nature has used the various colors in order to produce the apparent effect, and also the arrangement of the hues and direct digressions in order to blend one color into another, as an unwise combination of these will result badly.

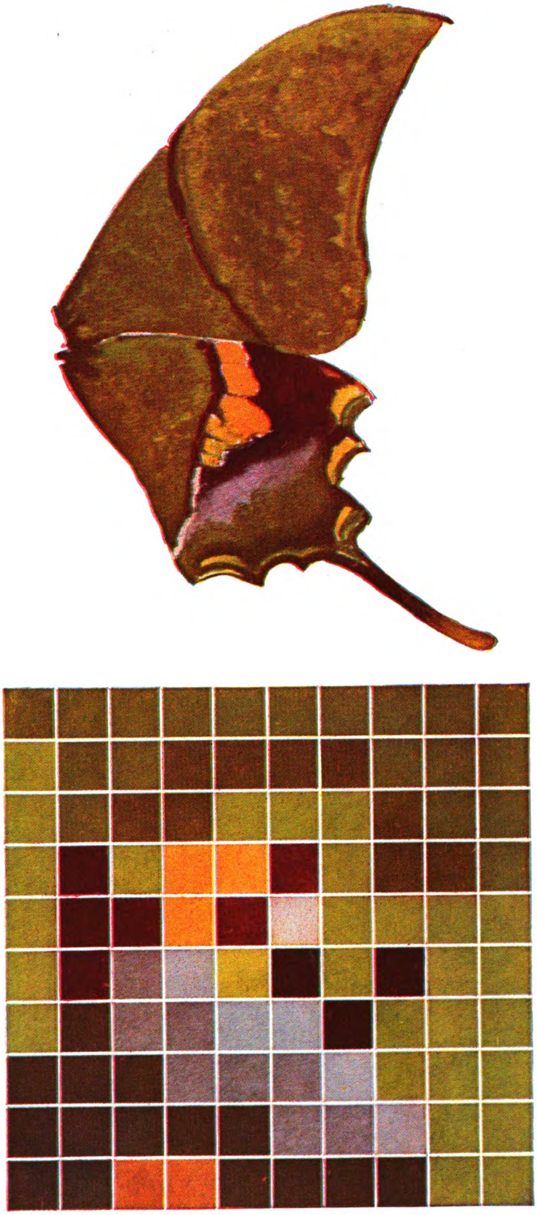


Fig. 11

In Fig. 11 is shown a chart of a color analysis about 2½ inches square. This is subdivided at intervals of ¼ inch so as to make a series of 100 squares, 10 on each side. Thus, in analyzing a color scheme, the percentage of each value, hue, and intensity can be estimated and painted with brush on the series of squares in order to produce a proper record. In Fig. 11, the scheme is from a butterfly's wing. Experiments of this kind are very interesting, and exceedingly valuable in training the eye and the mind, not only to appreciate color, but to appreciate its proportion.

47. Color Schemes From Historic Examples of Decorative Art.—A third source from which inspiration for good color schemes may be secured is the examples of historic styles of decorative art that have been handed down from age to age. For those who have the advantage of being able to travel, some of these old decorations may be seen in Egypt, Greece, Italy, Spain, India, France, Germany, England, etc. However, there are numerous books published on historic decorative art in colors that may be seen in reference libraries. The Section in this Course devoted to historic styles shows many examples of these historic styles in color, and these will serve as valuable reference material when planning color schemes.

Whether or not these ancient peoples had any system in getting up their color schemes, it is evident that their schemes are harmonious, starting with the simple and almost crude coloring of the Egyptians; going down through the more refined coloring used by the Greeks; continuing on to the brilliant coloring of the Moors; thence to the soft and beautifully subdued warm coloring of the people of India and Persia; thence to the dull somber coloring of the Germans; down through the brilliant and vivacious coloring used by the French, to the refined schemes of the English and American decorative artists.

The observant designer will always be able to get good color suggestions from these ancient styles of decorative art, whether he wants to use the color schemes for modern adaptations of historic styles or to employ them in modern original designs. Color suggestions from this source will in many cases be very valuable.

SIMPLE METHODS OF SECURING HARMONY

48. When the color inspirations and color harmonies as observed in the scientific analysis of light, the various combinations of color as seen in nature, and the various combinations of color seen in historic period styles, have been observed and color notes made thereof, the student is ready to put together these data so as to prepare original color schemes that are harmonious. There are definite laws and rules for color harmonization which enable one to produce with mechanical exactness color schemes that are good; but before considering them it will be well to look at some simple methods of securing harmonious color schemes.

49. Schemes From a Restricted Range of Values.—A simple method of securing color harmony, and one that cannot fail, is to use colors whose values are not widely separated in the neutral scale. In other words, when using two or three colors in a color scheme, select colors whose contrasts of value are not great. For instance, referring to the chart in Fig. 3, if two or three colors are employed, let them be colors somewhere between *high light* and *low light;* or between *light* and *medium;* or between *medium* and *low dark*, in the neutral scale. With the chart of Fig. 3 in front of him, the student can make no mistake in getting up such harmonies. For instance, yellow-orange and blue-green; orange and blue; orange-red, blue, and violet; will all harmonize, because they are close together in the neutral scale. Thus the harmony will be better than it would be if the colors were widely separated in the scale and of sharp contrast.

50. Schemes From a Predominating Value.—Another plan of arranging harmony is to have one value predominate. Let it be assumed that a number of colors are to be used; several of them may be *high light* in value, or perhaps *low dark* in value, with the other color or colors of some neighboring value. For instance, referring again to Fig. 3, yellow-orange and yellow-green, both *light* in value, may predominate, and some neighboring color may be used with them. Or, again, red and blue, both *high dark* in value, may predominate, with some neighboring color occupying a subordinate place.

51. Schemes From a Predominating Hue.—Another plan of securing good color schemes is to have some hue predominate in the scheme. For instance, if, in using a certain number of colors in a scheme, a tinge of red is allowed to run through them all, it at once gives them something in common and draws them together, such a color scheme being a warm color scheme. If blue, for instance, is used to tinge all the colors in the scheme it becomes a predominating color, and the scheme will likely be a cold color scheme.

52. Schemes From a Predominating Degree of Intensity.—Still another method of using some predominating, or common, element, is to employ a common degree of intensity throughout all the colors in the scheme. This can readily be seen by noting how, when colors that are too harsh are placed together they can be made harmonious by toning them down or diminishing their intensity; that is, by graying or subduing the brilliancy of the colors.

MECHANICAL METHODS OF SECURING HARMONY

53. Methods of Mechanical Apparatus.—There are certain pieces of apparatus on the market so graded and adjusted that, by purely mechanical means, colors may be selected that will illustrate absolutely correct harmony. While such pieces of apparatus, charts, etc. will be recommended to those who may desire to carry color theory to that extent, it is best not to become dependent on such mechanical apparatus for the selection of color schemes. The mechanical means discussed on the succeeding page are purely graphical, and are based on the color chart of value, hue, and intensity shown in Fig. 3, and as illustrated in Fig. 12. In this way, while having accuracy as a basis for locating the colors, the matter of personal taste and judgment of the designer is allowed to have some influence.

54. Method of Reducing Intensity One-Half.—In Fig. 12 (*a*) is shown, on a small scale, the same chart of hue, value, and intensity as shown in Fig. 3. However, in Fig. 12 (*a*) none of the colors are actually filled in on the proper squares, but are simply designated, the selected colors being marked with X's so as to show clearly the ones to be harmonized.

Let any three colors be selected, as orange, blue-green, and blue-violet, as shown in Fig. 12 (*a*). These colors in their full intensity are not what could be termed particularly harmonious. A simple method of harmonizing them mechanically is shown at (*b*), where they have simply been moved over to the position of half intensity, and thus grayed or subdued one-half.

55. Method of Raising Colors Half Way to White. Another graphical method of harmonizing the colors is shown in (*c*), where the colors are all lifted half way toward *white* in the neutral scale, and at the same time reduced in intensity. By drawing straight lines from the center of each square occupied by the three colors orange, blue-green, and blue-violet at full intensity, to the center of square white of the neutral scale, and dividing each line in half, and noting where the half-way points fall, the proper values and intensities of the colors may be located so as to secure harmony. For instance, in (*c*), these half-way points are located as shown, being a *light* to *high light*, half-intensity orange; a *light*, half-intensity blue-green; and a *low light*, half-intensity blue-violet.

56. Method of Lowering Colors Half Way to Black. In Fig. 12 (*d*) is shown a method of harmonizing the colors similar to that in (*c*), except that instead of being raised half way to *white* the colors are lowered half way to *black*. Lines are drawn from the centers of the three squares of selected color down to the center of the *black* square in the neutral scale, and then halved, the half-way points being noted, and colors so arranged. The resulting orange becomes a *dark*, half-intensity orange; the blue-green, a *dark*, half-intensity blue-green; and the blue-violet a *low dark*, half-intensity blue-violet.

Still other mechanical and graphical schemes may be devised to locate color harmonies in an arbitrary way.

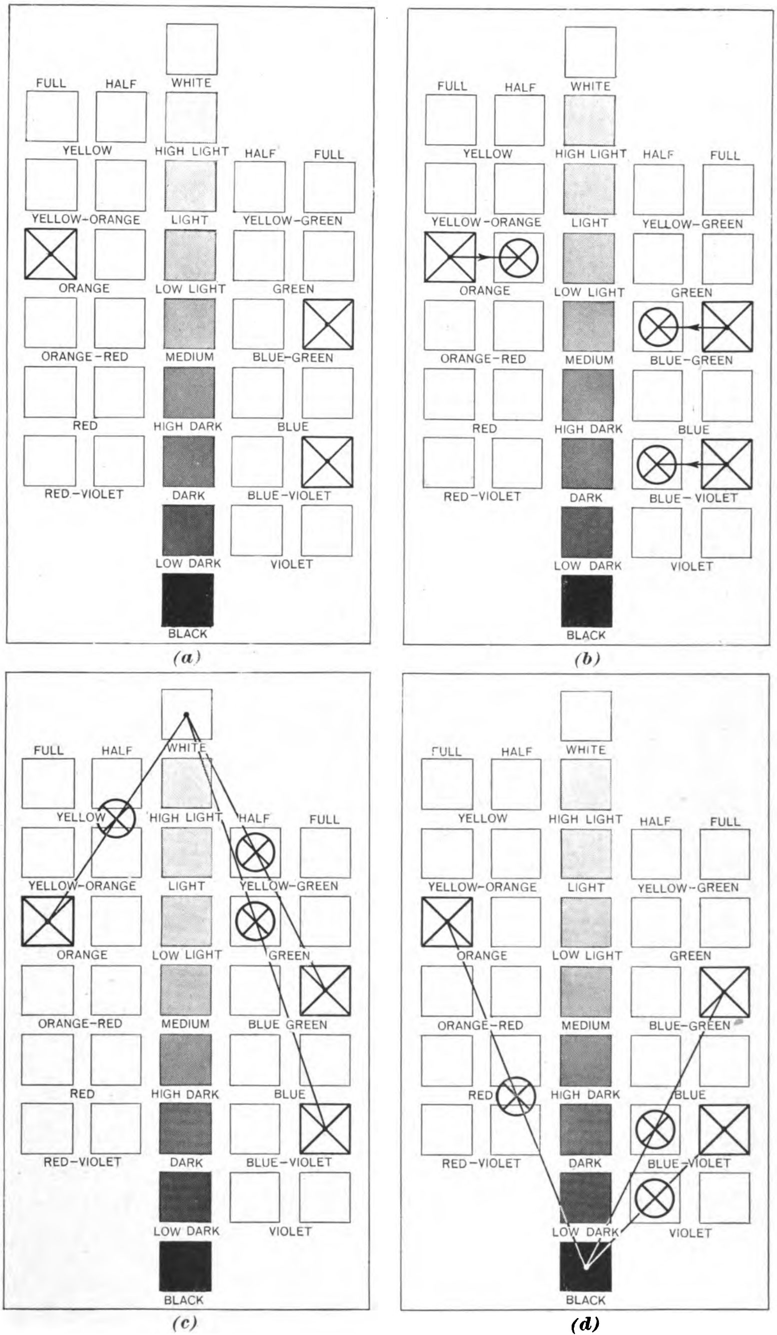

WHITE
FULL
HALF
YELLOW
HIGH LIGHT
HALF
FULL
YELLOW-ORANGE
LIGHT
YELLOW-GREEN
ORANGE
LOW LIGHT
GREEN
ORANGE-RED
MEDIUM
BLUE-GREEN
RED
HIGH DARK
BLUE
RED-VIOLET
DARK
BLUE-VIOLET
LOW DARK
VIOLET
BLACK
(a)
WHITE
FULL
HALF
YELLOW
HIGH LIGHT
HALF
FULL
YELLOW-ORANGE
LIGHT
YELLOW-GREEN
ORANGE
LOW LIGHT
GREEN
ORANGE-RED
MEDIUM
BLUE-GREEN
RED
HIGH DARK
BLUE
RED-VIOLET
DARK
BLUE-VIOLET
LOW DARK
VIOLET
BLACK
(b)
WHITE
FULL
HALF
YELLOW
HIGH LIGHT
HALF
FULL
YELLOW-ORANGE
LIGHT
YELLOW-GREEN
ORANGE
LOW LIGHT
GREEN
ORANGE-RED
MEDIUM
BLUE GREEN
RED
HIGH DARK
BLUE
RED-VIOLET
DARK
BLUE-VIOLET
LOW DARK
VIOLET
BLACK
(c)
WHITE
FULL
HALF
YELLOW
HIGH LIGHT
HALF
FULL
YELLOW-ORANGE
LIGHT
YELLOW-GREEN
ORANGE
LOW LIGHT
GREEN
ORANGE-RED
MEDIUM
BLUE-GREEN
RED
HIGH DARK
BLUE
RED-VIOLET
DARK
BLUE-VIOLET
LOW DARK
VIOLET
BLACK
(d)

FIG. 12

POOR COLOR SCHEME

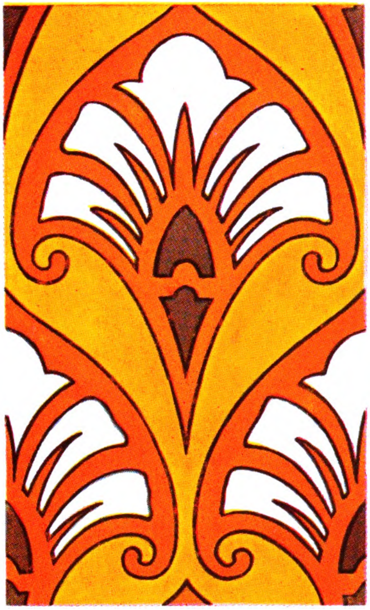


FIG. 13

GOOD COLOR SCHEME

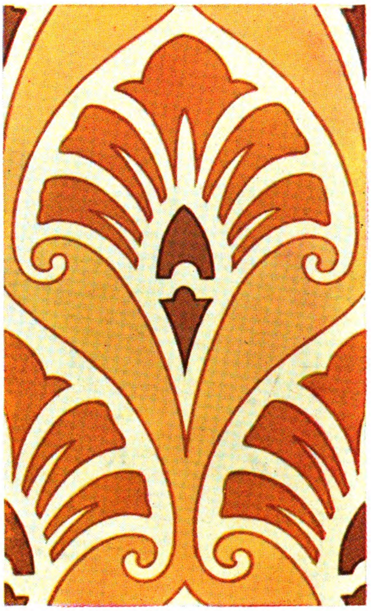


FIG. 14

POOR COLOR SCHEME

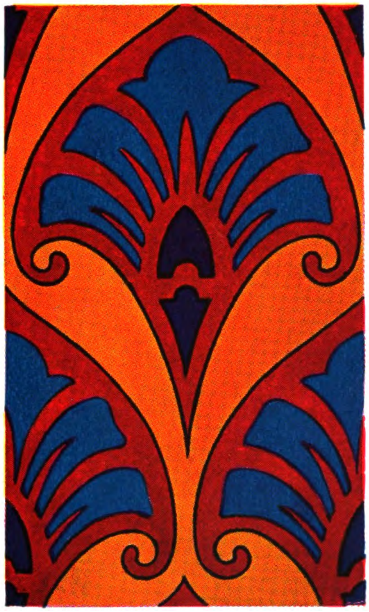


FIG. 15

GOOD COLOR SCHEME

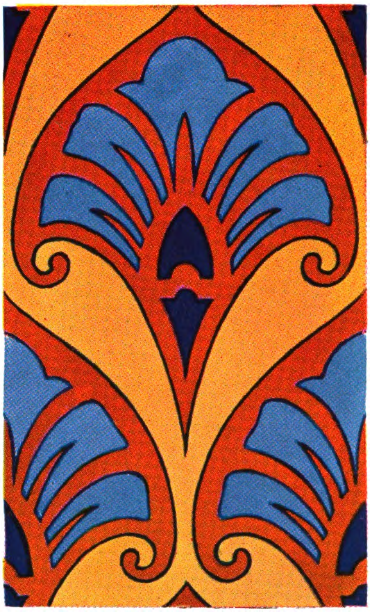


FIG. 16

CLASSES OF COLOR HARMONIES

57. Various Systems of Classification.—It is sometimes convenient to classify various forms of color harmonies so that the designer may refer to them readily and communicate his ideas to others. Various authorities have endeavored to establish a system that would embrace, under a limited number of heads, every possible combination. One classification is that of bad, inoffensive, satisfactory, attractive, and commanding; but such a classification is entirely too vague, and does not deal with the component colors themselves, but simply makes reference to the schemes as being good or bad.

A classification that is perhaps as clear and explicit as any, is to include all colors under the following heads: **dominant, complementary, analogous, perfected,** and **contrasted.** These classes of color harmony are illustrated in Figs. 13 to 20, inclusive, good examples being Figs. 14, 16, 18, and 20.

58. Dominant Harmony.—In Fig. 14 is illustrated an example of dominant harmony, in which class of harmony different values of the same color are combined in one scheme. In this example six different values of half-intensity yellow have been employed to produce the effect. Combinations of this kind are sometimes termed self-color, because they consist only of various values of the same color.

59. Complementary Harmony.—The example shown in Fig. 16 illustrates complementary harmony. In this class of harmony, complementary colors are contrasted, such as orange with blue, red with green, etc. In combinations of this character it is desirable that values should be opposed to one another as well as colors, or there is an unpleasant effect of movement in the color called *dancing*. Red and green possess this peculiarity to a very marked degree, particularly when the hues are actually equal in value. Light values of one color opposed to dark values of the complementary color will overcome this difficulty, and the introduction of several values of the same color will tend to lessen it, as shown in Fig. 16, where two values of blue with a dark outline are contrasted with two values of orange, thus forming a complementary harmony.

60. Analogous Harmony.—Analogous colors are those that stand near one another in the spectrum scale, such as yellow, yellow-orange, and yellow-green, or blue, green-blue, and violet-blue. When such analogous colors are used in a color scheme there is produced what is known as analogous harmony. In analogous harmony the intervals between the neighboring colors should not be too great. Such harmony is well illustrated in Fig. 18, where half intensities of green, green-yellow, and deep values of grayed orange are employed with great softness of effect.

61. Perfected Harmony.—To understand how perfected harmony is employed there must first be understood what is the *key color*, or the color possessed in common by both colors in an analogous scheme. For example, yellow-orange and orange-green may be used in an analogous harmony, their key color, the color possessed by each being orange. Now, perfected harmony consists in finding the complementary of the key color, in this case blue, and then contrasting the analogous colors with this complementary color. In Fig. 20, therefore, the yellow-orange and the orange-green are contrasted with blue, thus forming perfected harmony.

Perfected harmony exists also in combinations where two sets of analogous colors are complementary to each other. Such a harmony is of very wide latitude, for it takes in colors on either side of the opposing pairs of analogous colors; for instance, the group surrounding orange is opposed to the group surrounding blue.

62. Contrasted Harmony.—A fifth class of color harmony, which it is not considered necessary to illustrate here, is where color is opposed to, or contrasted with, non-color; that is, with neutral gray. For instance, a design of rich deep red could be placed on a background of light neutral gray. Or a light orange design could be placed on a deep gray field.

Other examples of contrasted harmony are those where color is contrasted with silver or gold.

63. How to Use the Classified Harmonies.—Knowledge of the classified harmonies is of the utmost importance to one using positive color for the first time, as it gives him a firm understanding by which he may proceed, and prevents wild and erratic attempts to produce effects without knowing the reason or the theory. It is an acknowledged fact that some persons seem to be possessed naturally of a color sense so that they can make good combinations and satisfactory harmonies without any apparent effort, while others of apparently equal intelligence seem utterly helpless when confronted with the color problem, and if left to themselves frequently make the most inharmonious combinations without apparently being able in any way to avoid this bad practice.

By this system of classification of color harmonies, the student is not possessed of the mere mechanical means for the formation of the best color combinations, but rather is given a suggestion as to what constitutes a safe combination of colors in the direction of harmony.

It will be good practice to prepare, with water colors, several schemes of color, illustrating two or more of the classes of color harmony. A very useful exercise is to attempt to classify, under each of the different classes of color harmony, such color combinations as may be observed in colored lights, in nature, and in historic examples; and then to record these classifications in sytematic order with water-color pigments.

When experimenting with colors that are closely related in the spectrum scale, it is by no means necessary that one should confine himself strictly within the limits set forth, as further variations of light and shade are always permissible by the good judgment of the student. In combining colors that are closely related to each other, it is a good rule to bear in mind that it is bad practice to combine a dark value of a brilliant color with a light value of a somber color, as this destroys the characteristics of the two colors. Such combinations should be so graded that the brilliant color will always be the lighter and the somber color the darker of the two. For instance, dark values of orange with light values of red, or dark values of yellow with light values of green, make a very bad combination.

In employing combinations that involve a contrast of the warm and cold colors, the warm colors advance and make themselves conspicuous, while the cold colors are retiring and tend to withdraw toward shadows. Where a design is executed in a reddish orange on a blue background, it will stand out and appear to detach itself from the ground and give forwards an effect that is particularly noticeable in designs for stained glass, where the lead lines increase the effect of difference in plane between the two colors. This is an exceedingly important point in the consideration of backgrounds; for, as a rule, dark cold colors make satisfactory backgrounds for patterns in warm hues, and dark warm colors are satisfactory as backgrounds when the pattern is in light cold hues. But if the intensity of the background and the pattern is about equal, the warmer colors advance and the cold colors retire. The success of these combinations is dependent as much on the proportioning of the masses as on the hues themselves. Some colors combine harshly if used in equal masses, but if skilfully proportioned one to the other, the harshness is overcome and a satisfactory harmony produced. Any of these combinations can be varied unlimitedly by the introduction of several values of the various colors given, or by combining these colors with neutrals—black, white, gray, silver, or gold—using these neutrals in outlines or in small masses in order to emphasize the effect.

These hints on color harmony are given, not as hard and fast rules by which one can mathematically calculate exactly what is required in each instance, but as suggestions along lines on which he can experiment and secure combinations that are efforts in the right direction and likely to produce successful color schemes.

One must study very closely the relations of two simple colors to each other before any attempt is made to more complex arrangements. Red and blue used together in their full strength are harsh, and light and dark values of these colors should be experimented with as well as combinations of each of them with another color until one is thoroughly familiar with the mental effect that is produced by the combinations of certain

POOR COLOR SCHEME

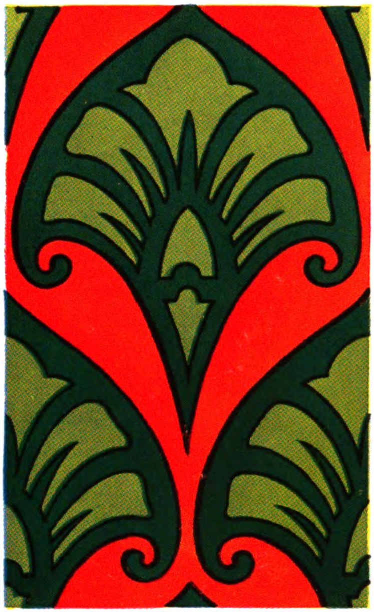


FIG. 17

GOOD COLOR SCHEME

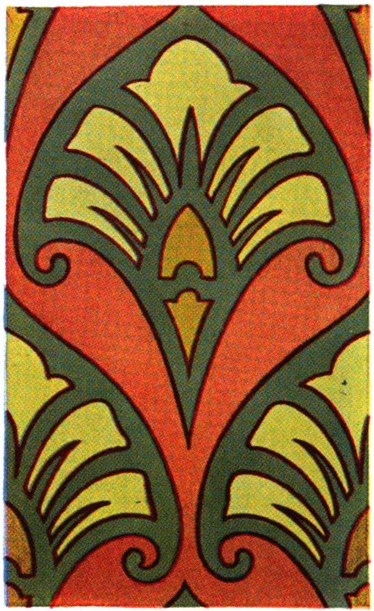


FIG. 18

POOR COLOR SCHEME

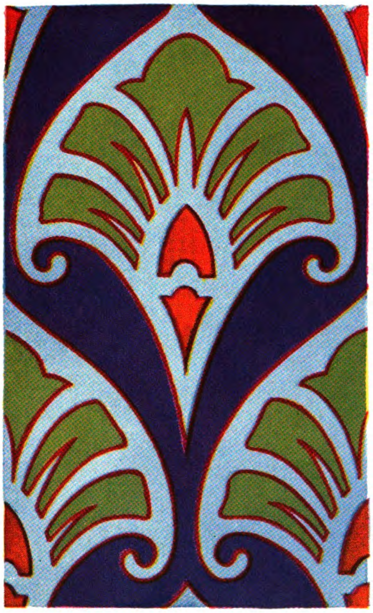


FIG. 19

GOOD COLOR SCHEME

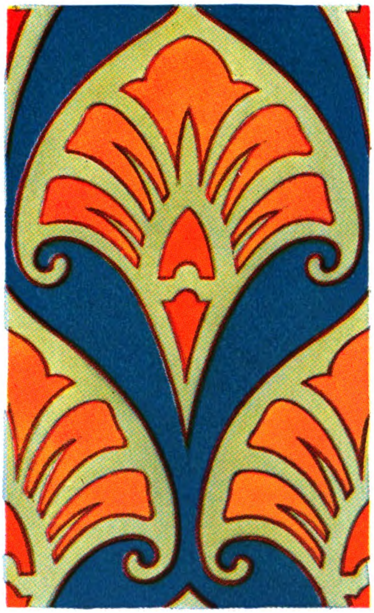


FIG. 20

hues, values, and intensities. Combinations of three colors can then be experimented with, increasing the intensity of one over another in order to give it prominence. But the mind should be thoroughly familiar with the effect that one color has on another before complex arrangements requiring two or more colors in combination with neutrals or with other colors are attempted.

COMPARATIVE EXAMPLES OF COLOR SCHEMES

64. Importance of Comparative Examples.—It will greatly assist the student in preparing good color schemes to see concrete examples of poor, or inharmonious color schemes for certain designs placed side by side with good, or harmonious, schemes for the same designs, and to be given explanations as to why the one is bad and the other is good. The information that is derived from these concrete examples may then be combined with the rules and suggestions previously given for color harmonization, and the result should be a fair ability to prepare original color schemes.

In presenting these examples of good color schemes as contrasted with bad color schemes, the same illustrations will be used as were employed when the various classes of color harmony were discussed; namely, Figs. 14, 16, 18, and 20, and also those on the left-hand side of the page in each case; namely, Figs. 13, 15, 17, and 19.

In examining Figs. 13 to 20, inclusive, to compare poor color schemes and good ones, the lower two on each page, as Figs. 15 and 16, and Figs. 19 and 20, should be covered with an envelope or a piece of blank paper, while the upper two on each page, as Figs. 13 and 14, and Figs. 17 and 18, are being examined. Similarly, the upper two should be covered while the lower two are being examined. Unless this is done the eye will be disturbed and confused by other colors on the page.

65. Poor Color Scheme for Dominant Harmony.—In using dominant harmony; that is, a number of values of the same color, in coloring the design, it is very easy to get a poor color scheme, as shown in Fig. 13, unless care is observed. The reason the color scheme in Fig. 13 is poor is because all the yellows are at brilliant full intensity, and there is too great a jump, or interval, between some of the values used. One of the secrets of securing good harmony is to reduce some or all of the colors or values to half intensity.

66. Good Color Scheme for Dominant Harmony.—In Fig. 14 the defects of Fig. 13 have been remedied. The yellows in most cases have been reduced in intensity, and more graded and progressive stages have been employed in arranging the different values. This statement should be proved by referring to the charts in Figs. 3 and 5, or the water-color charts that were prepared from these illustrations, and noting the graded intervals of tone values.

67. Poor Color Scheme for Complementary Harmony.—In coloring the design according to complementary harmony, it is again easy to fall into error. One might think that all that is required is to use complementary colors; but the mistake as made in Fig. 15 is an easy one. It is true that blue and orange are complementary colors, but a pure warm orange must be used with pure blue, and not a dark muddy orange, as in Fig. 15. Further, the violet-red fringe introduces still more blue, and thus makes the design still more inharmonious. A further element that interferes with harmony is the fact that all the colors are used at full intensity, and have not been graded in values.

68. Good Color Scheme for Complementary Harmony.—In Fig. 16 is shown the manner in which a good color scheme may be arranged for complementary harmony. The colors are not only complementary, being various values of pure blue and pure orange, but the colors have been properly grayed and arranged in interesting values. The orange used for the fringe of the spot ornament is a *medium* value at half intensity; the darker blue is of a *low dark* value and at half intensity; the lighter blue is of *low light* value and at full intensity; and the background is an orange-red of *high light* value and at half intensity. Reference should be made again to the charts in Figs. 3 and 5, and the values and intensities checked up.

69. Poor Color Scheme for Analogous Harmony. The tendency to fall into error in getting up the proper color scheme for an analogous harmony is much greater than in the case of any of the classes of harmony previously considered, on account of the rather complicated nature of analogous harmony. Such an error is illustrated graphically by the poor scheme shown in Fig. 17. It is known that analogous harmony is produced by analogous colors; that is, those colors that stand near one another in the spectrum scale. The mistake made in Fig. 17 is in using colors that are not near one another in the spectrum; the yellow grass-green is quite widely separated from the dark green, and the latter is widely separated from the rich red-orange of the background. Again, the error here is in failing to neutralize the colors; that is, to reduce their intensity.

70. Good Color Scheme for Analogous Harmony.—In Fig. 18 the defects of Fig. 17 are remedied. The greenish-orange, the yellow-green, and the lighter green are colors that stand very near one another in the spectrum. Further, good judgment has been shown in selecting the intervals of the tone values. But, that which again assists strongly in securing harmony is the reducing of the intensities. The blue-green fringe around the palmette in Fig. 18 is of *medium* value and half intensity; the light green of the palmette shapes is of *light* value and at half intensity; the yellow-green is of *light* value and half intensity; and the red-orange background is of *low-light* value and grayed to half intensity.

71. Poor Color Scheme for Perfected Harmony.—To secure perfected harmony it is necessary to contrast analogous colors with the complementary of the key color, or color common to all the colors. Since this is a rather complicated procedure, care must be exercised to find the key color and then get its complementary. Thus it can be seen that one may easily make an error in judgment that will result in a poor color scheme, as illustrated in Fig. 19. The colors that have been used for the palmette, blue-green and red-orange, have no pronounced key color, or common color. It might be said that yellow would be the common color, because there is yellow in both green and orange. This is true, theoretically, but the yellow is not sufficiently pronounced to actually be a common color visually. Even if yellow were the key color, the contrasting color in the background, blue-violet, would not fulfil conditions, for it would not be the exact complementary of the very weak amount of yellow. If it were pure rich violet, not blued, and of full intensity, it would be the complementary color. Thus, several discrepancies work against making Fig. 19 a good color scheme for perfected harmony.

72. Good Color Scheme for Perfected Harmony.—In Fig. 20 the discrepancies referred to as existing in Fig. 19 are eliminated, with the result that a good color scheme is secured. The main colors of the ornament, orange-red and orange-yellow, are analogous colors, orange being the key color. The complementary of orange is blue, which is the color used in the background, thus securing a good color scheme. The intervals of value are well managed, the orange-red being *high dark* at full intensity, the orange-yellow being *light* at full intensity, and the blue being *dark* at full intensity. As the color contrasts in perfected harmony are rather subtle, it is found expedient not to gray them, but to use them at full intensity. However, the color scheme could be improved still further if the hues were reduced somewhat in intensity.

73. Testing for Good and Bad Color Schemes.—If ability to judge which color schemes are good; that is, harmonious, and which are bad, or inharmonious, is desired, analysis of color schemes should not terminate with the examples that have been shown in Figs. 13 to 20. A good test for one to make would be to draw in pencil outline the design shown in Fig. 4, and in Figs. 13 to 20, and then color it to the best of his ability. This color scheme should then be subjected to searching test and criticism such as has been given for Figs. 13 to 20; and then a second, or even third, trial should be made at producing a good scheme, remedying therein any discrepancies that may have appeared in the first attempt. In making these repeated tests and trials at new schemes, a good plan is to pin a piece of white transparent tracing paper over the pencil drawing of the design and then make the different experiments for color schemes on the tracing paper.

Another plan is to collect a number of designs for various fabrics and objects, such as wallpapers, rugs, etc., which designs have actually been made up commercially, and subject these to tests and analysis. Not every commercial design will be found to have a good color scheme; but by making these analyses it is possible to learn what is bad and what is good and thus be able to avoid the bad and work only to secure the good in color schemes.

It must be remembered that the present discussion refers to the methods of producing *harmonious* color schemes; not glaring or startling ones. The superficial observer, with an untrained color sense, might select the glaring color schemes of Fig. 17 and Fig. 19 as good color schemes; but they are not. Such a selection would simply reveal the need of that person to have a training in correct color harmony. It is true that the influence of the designers and colorists from certain European countries have, in late years, given the United States color combinations in dress goods, fashions, printed designs, etc., that are harsh, crude, glaring, and in no sense harmonious. With these this treatise on color harmony has nothing to do.

COLOR APPLIED TO DESIGNING

74. Nature Studies Made in Color.—The test as to whether or not one has been trained in the principles of color and as to whether or not he has a sense of color harmony comes when he attempts to prepare designs in color. The use of color in design is not like the system a child uses when coloring line prints or charts, or such as one uses when painting a house or a fence. Such methods are simply the application of pigment to that which has already been made or designed. But when designing with color, the color becomes a component part of the design itself, appearing even in the design motif before the design as such was formed.

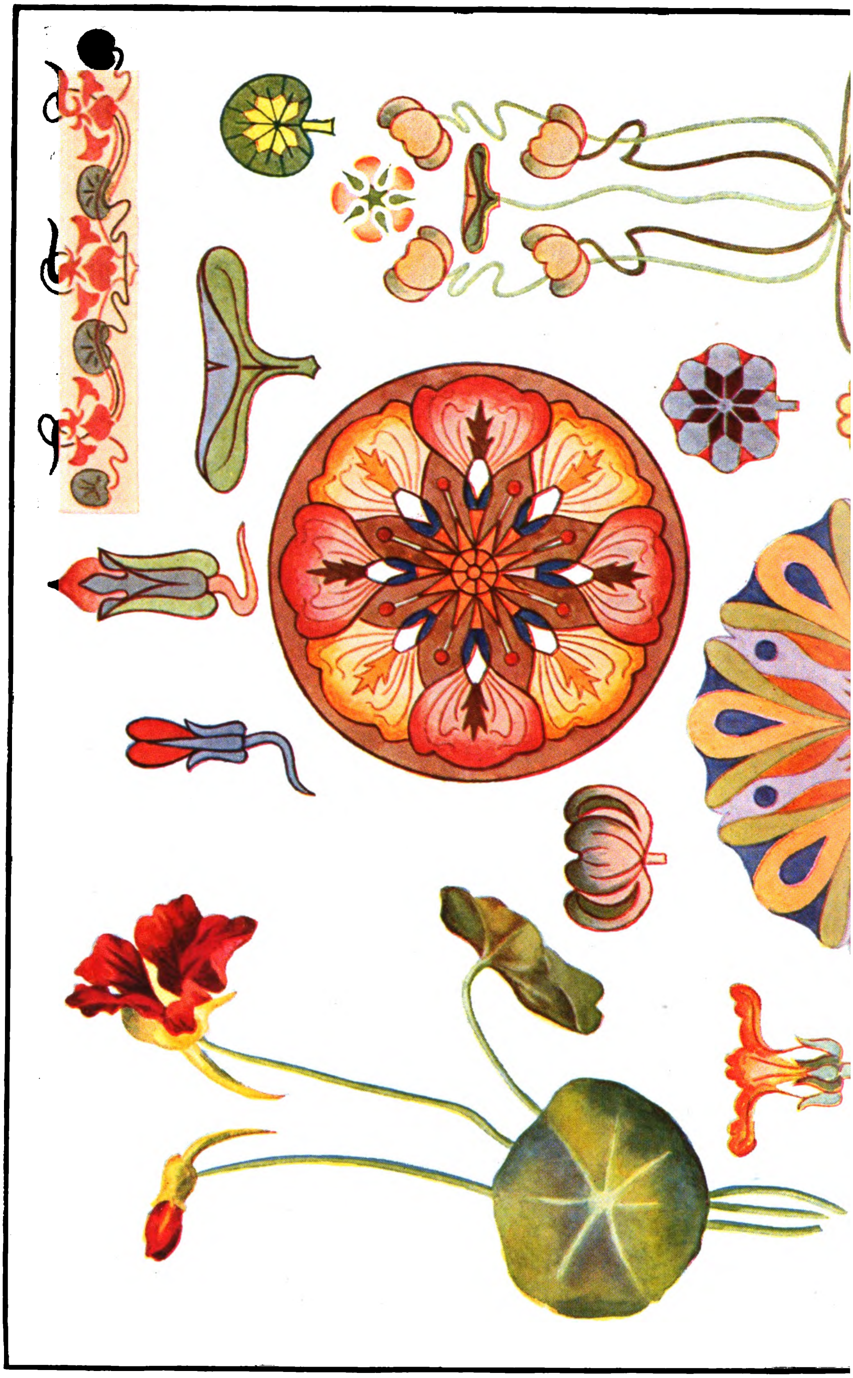
The very first step, therefore, is to make the preliminary plant studies in colors. Directions have already been given for making plant studies in pencil and in monochrome wash; but the ideal method is to make the studies in the actual colors of nature. Such a study is that of the nasturtium shown in the upper left-hand corner in Fig. 21. Here the leaves, stems, and flowers are painted in the colors of nature, and, while there is no necessity for a conventional design being painted in exactly the colors seen in the natural specimen from which the design motif was formed, such natural colors will be of great assistance when the conventionalized motifs, and the designs made therefrom, are prepared.

75. Conventionalized Motifs Made in Colors.—After the nature studies are made in color, the next step is to make conventionalized motifs, in color, from these plant forms, by the methods described in previous Sections.

Fig. 21 also shows, in the upper right-hand corner, examples of color work in conventionalized motifs. Right below the bottom of the stems of the naturalistic painting of the nasturtium is shown a motif made of petals conventionalized, curving symmetrically, and colored appropriately. Above, and to the right of, this petal motif is a conventional profile view of the entire flower, with stem calyx, petals, etc., symmetrically drawn, and colored as in the natural specimen. At the top of the illustration, and to the immediate right of the naturalistic nasturtium flower are other conventionalized motifs, based on the calyx, leaves, etc., and appropriately colored. These few examples are sufficient to show how the conventionalized motifs may be prepared in colors.

76. Color Designs for Limited Areas.—The principles and methods of making designs for limited areas have already been explained. To make such designs in colors needs only the application thereto of the principles of color and harmony that have been discussed.

Fig. 21 shows such specimens of designing for limited areas. Most prominent of these are the two large circular shapes on the upper part of the vertical center of the illustration. The



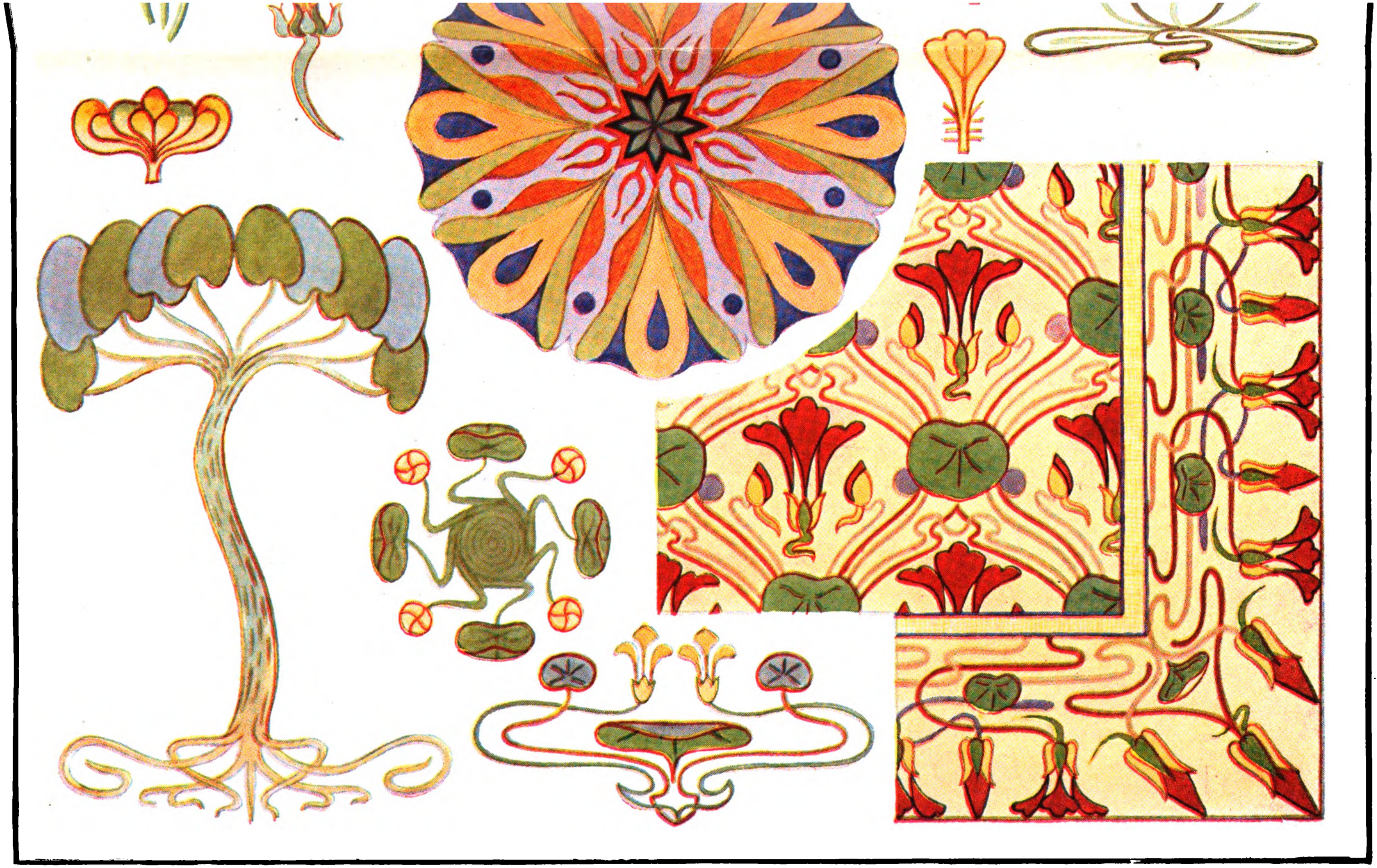


FIG 21

upper one is enclosed within a circle, the details of the decorative motifs that fill this circle radiating from the center and being composed of conventionalized profile views of the calyx and petals of the nasturtium, properly colored. The lower circle is formed by some eight radiating conventional shapes based on the nasturtium, but with a different system of coloring. To the right of the upper large circle and in the lower left-hand corner of the illustration, are shown conventionalized motifs arranged to fill rectangles and squares, being composed of stems, and profile and full-face flowers, arranged and colored harmoniously. In the upper and lower right-hand corners are shown border designs arranged according to principles already discussed, design motifs being used such as are shown elsewhere in the illustration.

77. Color Designs for Unlimited Areas.—When getting up designs for all-over repeating patterns, motifs and color schemes are arranged under the same principles as employed for unlimited areas. Whether the pattern be an ordinary side-to-side repeat, or a drop repeat, or a drop-and-turn-over repeat, the color may be used in the same way as previously described.

Fig. 21 also illustrates the making of designs in color for repeating patterns. In the lower right-hand corner, above and to the left of the nasturtium border, is an all-over, side-to-side repeat, based on a diamond or lozenge unit and a wide ogee repeat, using the conventionalized nasturtium stems, leaves, and flowers. The same motifs are employed as are used in the adjacent border, which it is designed to accompany.

Thus it will be observed that Fig. 21 illustrates the entire process of making a design in colors, starting with the naturalistic study, then making the conventionalized motif, and then making designs for limited areas and for unlimited areas, the rules of color and color harmony being applied to all the processes. Fig. 21 should therefore prove of great value to the student when getting up original floral conventionalizations and designs in color; not to be copied, but as a suggestion for methods of procedure.

COLOR-IN-DESIGN EXERCISES

GENERAL INFORMATION

78. Required Work in This Section.—As a training in color theory, color matching, color harmony, and the handling of colored pigments for the preparation of color schemes for designs can be obtained with practical value only by actually doing the work, the required work in this Section will consist of such colored charts and designs. The directions for handling the pigments and preparing the charts and designs are given in full detail in the text, and need only be followed with care by the student in order that successful work may be done on the plates that follow.

79. Character of the Drawing Plates.—There are six drawing plates required, each about 9⅞ in. × 15¼ in., but referred to as being 10 inches wide by 15 inches high, depending upon the exact dimensions of the drawing paper or water-color paper. The first four plates contain one exercise each, running the entire 15-inch height of the sheet. The fifth and sixth plates are divided horizontally by a center line, thus making on each plate two rectangles each 10 inches wide by 7½ inches high. The plates are to be sent to the Schools one at a time for examination; and, while this plate is being examined and returned, work may be commenced on the plate that follows.

As in the case of previous subjects, the charts and designs that are prepared in this color work are not intended to be designs for any specific fabric or object. The purpose is simply to give a training in the theory and practice of color harmony and the getting up of good color schemes, this training to be applied to practical commercial design work when specific lines of design are studied later. Nevertheless, the colored designs called for must be accurately rendered.

PLATE 1

80. The Exercise for Plate 1.—With the 10″×15″ sheet of paper arranged vertically, lay out and color a chart, showing primary colors, secondary colors, tertiary colors, and color grays, as illustrated in Fig. 1, and as described in full in the text. The chart is to be twice the size, in all its dimensions, of the illustration shown in Fig. 1, each square being 1 inch on a side, and 1 inch or $1\frac{1}{4}$ inches being allowed between the vertical rows and $\frac{1}{4}$ inch between the horizontal rows, thus making ten horizontal rows of three 1-inch squares each, as shown.

81. Final Work on Plate 1.—Letter or write the title, Plate 1: Color in Design, at the top of the sheet, and on the back place class letters and number, name, address, and date of completing the plate. Protect the face of the plate by a piece of tissue paper, roll it and place it in the mailing tube, and send to the Schools for examination. Then proceed with Plate 2.

PLATE 2

82. The Exercise for Plate 2.—On the 10″×15″ sheet arranged vertically, lay out and color a chart showing value, hue, and intensity, as illustrated in Fig. 3, and as fully described in the text. This chart is to be twice the size of the one in Fig. 3, each square being about 1 inch on a side, with a space of about $\frac{1}{2}$ inch separating it from adjoining squares. First should be laid out and painted the middle vertical column with its squares of graded values of black (charcoal-gray); then the two left-hand vertical columns and the two right-hand vertical columns should be laid out and colored as shown. The second and fourth columns should then be grayed so as to be at half intensity.

83. Final Work on Plate 2.—Letter or write the title, Plate 2: Color in Design, at the top of the sheet, and on the back place class letters and number, name, address, and date of completing the plate. Protect the face of the plate by a piece of tissue paper, roll it and place it in the mailing tube, and send to the Schools for examination. Then proceed with Plate 3.

PLATE 3

84. The Exercise for Plate 3.—With the 10″×15″ sheet arranged vertically, prepare a chart of color matchings arranged somewhat like, but not a copy of, the chart shown in Fig. 10, and as described in detail in the text. The left-hand vertical row may consist of pieces of yarn, cotton, woolen, silk, or any other fabric, pasted or sewed onto the paper. The right-hand vertical row should consist of squares filled with washes of water-color pigment that exactly match the general color, including value, hue, and intensity, of the fabric opposite which the square of color is placed.

85. Final Work on Plate 3.—Letter or write the title, Plate 3: Color in Design, at the top of the sheet, and on the back place class letters and number, name, address, and date of completing the plate. Protect the face of the plate by a sheet of tissue paper, roll it and place it in the mailing tube, and send to the Schools for examination. Then proceed with Plate 4.

PLATE 4

86. The Exercise for Plate 4.—In the center of a 10″×15″ sheet arranged vertically, make a chart of color analysis such as shown by the butterfly wing and the varicolored squares beneath in Fig. 11. Do not copy Fig. 11, nor use a butterfly wing for analysis. Use an autumn leaf or some varicolored piece of vegetation that can be mounted flat. Then beneath it lay out a large square subdivided into 10 parts on a side, making 100 little squares, and classify the colors therein according to quantity and location, as explained for the butterfly wing in the text accompanying Fig. 11.

87. Final Work on Plate 4.—Letter or write the title, Plate 4: Color in Design, at the top of the sheet, and on the back place class letters and number, name, address, and date of completing the plate. Protect the face of the plate by a sheet of tissue paper, roll it and place it in the mailing tube, and send it to the Schools for examination. Then proceed with Plate 5.

PLATE 5

88. **Exercise A, Plate 5.**—Prepare an original design for an all-over repeating pattern to fill a space about 8 inches wide by 6 inches high, and place it in the upper 10″×7½″ rectangle of the plate. Color this design with a color scheme that is secured by selecting any three colors that do not clash and raising them one-half the way toward white, as shown in chart (*c*) of Fig. 12, and as described in the accompanying text. Do *not* use the same colors indicated in Fig. 12 (*c*). When doing the coloring, consider the relative amounts and placing of the various colors, as well as their values, hues, and intensities.

Beneath the design place three squares or strips showing in flat washes the three colors selected for the design.

89. **Exercise B, Plate 5.**—Using exactly the same 8″×6″ pattern that was designed and used for Exercise A, place it in the lower 10″×7½″ rectangle of the plate, and color it with a color scheme that is secured by selecting any three colors that do not clash and lowering them one-half the way toward black, as shown in chart (*d*) in Fig. 12, and as described in the accompanying text. Do *not* use the same colors indicated in Fig. 12 (*d*). Consider relative amounts and placing of colors, as well as hues, etc.

Beneath the design place three squares or strips showing in flat washes the three colors selected for the design.

90. **Final Work on Plate 5.**—Letter or write the title, Plate 5: Color in Design, at the top of the sheet, and on the back place class letters and number, name, address, and date of completing the plate. Protect the face of the plate by a sheet of tissue paper, roll it and place it in the mailing tube, and send it to the Schools for examination. Then proceed with Plate 6.

PLATE 6

91. Exercise A, Plate 6.—Using the same pattern that was designed and used for the exercise of Plate 5, place it in the upper 10″×7½″ rectangle of Plate 6, and color it according to the laws of dominant harmony, illustrated in Fig. 14 and fully explained and described in the accompanying text. Do not use the same colors as shown in any text illustration of a design in colors; make the color scheme original. Consider relative amounts and placing of color, as well as hues.

Place beneath the design squares or strips of flat washes of the colors selected, as before.

92. Exercise B, Plate 6.—Using the same pattern as used for Exercise A, place it in the lower 10″×7½″ rectangle of Plate 6, and color it according to the laws of perfected harmony, illustrated in Fig. 21 and fully described in the accompanying text. Do not use the same colors as shown in any text illustration of a design in colors; make the color scheme original. Consider relative amounts and placing of color, as well as hues.

Place beneath the design squares or strips of flat washes of the colors selected, as before.

93. Final Work on Plate 6.—Letter or write the title, Plate 6: Color in Design, at the top of the sheet, and on the back place class letters and number, name, address, and date of completing the plate. Protect the face of the plate by a sheet of tissue paper, roll it and place it in the mailing tube, and send it to the Schools for examination.

If any redrawn or rerendered work on any of the plates of this Section has been called for and has not yet been completed, it should be satisfactorily finished at this time. After all required work on the plates of this Section has been completed, the work of the next Section should be taken up at once.

HISTORIC STYLES

PURPOSE

1. Reasons for Studying Historic Styles.—Up to this point the student of design has been trained to evolve original work only. Whatever drawing, nature study, conventionalizing, or actual preparation of designs he has accomplished has been in every respect original. He is now ready to study and take advantage of the good features in the work of other designers who have lived and worked throughout all ages, from ancient times down to and including the present era. To have asked the student to study such work before he had been trained to prepare designs of his own would have been a faulty plan.

While the successful designer goes to nature for inspiration, and from nature prepares his conventionalized motifs and designs, it must be remembered that ever since civilization began men have been making designs for all conceivable purposes, and all down through the ages they have been using nature and nature's plant forms as motifs for their designs. Naturally, certain typical and standard decorative forms must have come into being that, although derived from nature, by this time bear little resemblance to anything in nature, but can be employed to considerable advantage when making designs for certain purposes. Such forms are not evolved by the modern designer who uses them, but have been worked out by some designer in the past and handed down in their entirety to be used as such by the modern designer when putting together his present-day patterns.

Inasmuch as the designing and establishment of these forms has been going on through the various ages and periods of the

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world's history, their character must naturally have been influenced by the temperament and the racial, climatic, political, and other characteristics of the countries, and of the peoples who lived in those historic periods. These arbitrary decorative forms are for this reason spoken of as historic styles, and it is as historic styles that they will be discussed in this Section.

2. **Method of Studying Historic Styles.**—Unless the young designer understands why he is studying the historic styles, such a line of study becomes uninteresting, irksome, and even laborious; and in some cases it is done under protest. The method of presenting the subject in this Section, however, will be for a specific purpose.

The study of historic styles for designs differs in a peculiar way from the study of arbitrary and plant-form motifs for designs, in that the units or motifs in the historic forms are not themselves evolved, as in the case of arbitrary or plant-form motifs, but are established and standard, and must be adopted as they stand. One cannot take a form or a detail from some historic style and twist and turn and alter it as he can a plant form. If he did so, he would spoil it entirely, and it would no longer be characteristic of that historic style or period. The natural question therefore arises as to how these historic forms are to be studied and made use of by the modern designer.

3. **Historic Design Forms for Reference.**—A further purpose of presenting to the student a treatise on historic styles is that the styles shown therein may be used for reference when practical designing is being done. The purpose is that they may serve as a sort of treasury to which the student may go to secure decorative forms to use in designs that are to be characteristic of, or in harmony with, general decoration schemes of some historic period. For instance, suppose a decorator is required to cover with decoration the walls of the interior of a church that is distinctly Gothic in style. He cannot invent or evolve Gothic decoration from plant forms; he must use Gothic forms that are authentic and reliable, and these can be secured only from actual specimens that still exist, or from pictures of such specimens.

The purpose, therefore, of this Section is both to give the student inspiration for good modern work and also to serve as a grammar of art and design to the designer, not to be carried in the head and memorized, but for reference when needed.

4. Historic Styles Commercially Necessary.—There are some extremists who would eliminate entirely a study of historic design forms from the training of the designer. Advocates of such a plan are usually those who want to study "art for art's sake," and are too short-sighted, or perhaps too uninformed, to see that any study of design that is to be at all worth while must be studied for commercial application. Commercial designers are called upon constantly to design or decorate something in a definite historic style; such as gas and electric fixtures, wall papers, mural paintings, carpets, rugs, etc. This practical fact is the most conclusive argument that can be advanced for the necessity of the designer studying historic styles.

5. Period Styles of Different Countries.—The purpose here is not to present a history of nations and their customs and characteristics, but to give examples of the designs produced by, and characteristic of, the various nations, with brief explanations and comments on each class.

While national characteristics undoubtedly had considerable influence upon the design motifs and the designs produced by each nation, all that the designer needs to know is what the decorative work of each country was like, in form and color, and how and under what conditions it can be applied to modern designs. It is in this way, and to this extent, that the material in this Section will be presented.

HISTORIC PERIODS AND THEIR STYLES

PRIMITIVE

6. Origin of Design Motifs.—Opinions differ as to how decorative motifs, and design and decoration, first came to be used. We know, however, that the very first efforts of man on this planet were for utilitarian purposes. He made his shelter—hut, cave, or whatever it was—his cooking utensils, his hunting implements. Then came the gradual development of the finer emotions—love, religion, reverence, a fear of the hereafter, sorrow, etc. With these finer emotions came the finer forms of expression; when this primitive man lost a child by death he mourned, and he hung a garland of flowers in memory of the child. If his father or brother died, he carved upon his utensils or the walls of his cave pictorial or decoratively symbolical records of events in the lives of those who had passed away. First came utility; later, design and decoration.

These peoples had no written history of art from which to draw ideas, no theory or rules of proportion to govern their conceptions. The expression of art as exhibited in their decorated utensils can be considered pure and untrammeled.

7. Origin of Decoration.—From the testimony of travelers in but partially explored countries, it would appear that there is no place on the face of the earth where some attempt is not made at design and decoration, no matter how crude a state of civilization the people may be in. The desire for decoration is present in every race, and it develops and increases in importance directly in proportion to their progress in civilization. Man appears everywhere impressed with the beauties of nature that surround him, with the mysteries governing the growths and phenomena that he cannot understand; and he seeks to imitate, within the limitations of his power, some of the works of his Creator. The earliest instinct of man is to create something. No matter how powerful he may be as a warrior, how distinguished he may be as a tribal leader, or how wealthy he may be in the possession of earthly goods, he recognizes his inability to explain the phenomena of nature, and naturally attributes it to a being higher than himself. It is at all times apparent that this being, whom he in his primitive way may worship as a god, creates, by some undefined power, developments and appearances that inspire him with mystery and awe. Consequently, he endeavors, in his own simple way, to call into existence creations of his own that shall impress those fellow men whom he considers his inferiors as much as he is impressed by the works of his mysterious Supreme Being.

8. In some savage tribes this desire is expressed in the attempt to increase the facial expression by which he expects to strike terror to his enemies, rivals, or inferiors, or to create what appears to him a new and mysterious beauty. This he accomplishes by tattooing, or sometimes merely with paint. It is a remarkable fact that hideous as this practice renders his visage, it is, in most cases, exercised with the greatest care that the lines shall be so placed as to *increase* the facial expression and *develop*, to the greatest extent, the eccentricities of his natural features. Trivial as this detail may at first appear, it lies at the bottom of the fundamental principles of decorative design. The savage warrior does not obliterate his own expression and cover his face with paint and tattoo marks to create a new one, but simply arranges the lines to emphasize the details of severity that he already possesses and with which he expects to inspire an impression of terror.

9. Origin of Set Styles.—It can be clearly shown throughout all history that in certain periods an individual mind, stronger than those with which it is surrounded, will impress itself on a generation and carry with it a host of other minds of inferior power. These inferior minds imitate what they know to be better than what they can create, but do not imitate so closely as to destroy their own individual ambition to originate. Thus there come the birth and the modifications of styles.

The efforts of the people in the earliest stages of civilization are like those of children; though lacking in power of expression, they possess a grace and originality rarely found in middle age, and never in manhood's decline. The same may be found in the infancy of any art. When art struggles for an existence, it succeeds by creating for itself new forms and new ideas, but, when reveling in its own successes, it fails.

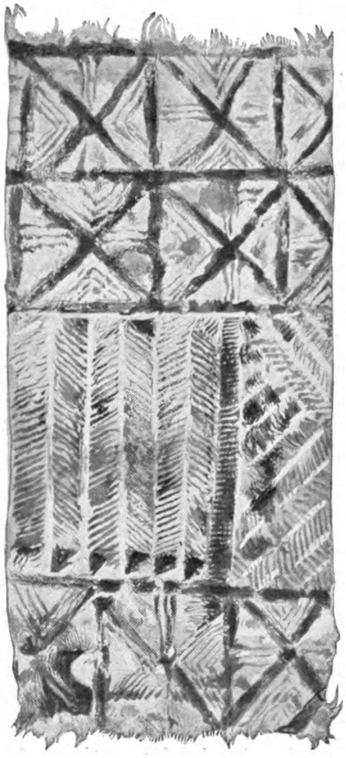


FIG. 1

10. Expression of Taste in Savage Decoration.—In Fig. 1 is shown a reproduction of a cloth pattern, the original of which came from the savage tribes of the Samoan Islands. It is made from thin sheets of bark stripped from a peculiar species of tree, and is beaten out and united so as to form one long parallelogram of cloth. Certainly nothing could be more primitive as a method of manufacture, yet the pattern shows the existence of taste and skill, and an ingenuity of design rarely found in many of our woven fabrics of the present day. The pattern is executed by means of small wooden stamps, and the work, though rude and irregular in its execution, conveys the intention at every point. There is a skilful balancing of the masses and a judicious avoidance of lines that would tend to cause the eye to run in one direction. This is done by opposing each set of lines with others of opposite tendency. There are many styles and patterns of this work, all of which show positive genius in their arrangement and development.

11. Decorative Theory Exhibited by the Savage.—The next development in this primitive art is found in the attempts at wood carving, and the most likely place to look for it would be on the weapons used for the defense of the tribe or in the chase of animals for food. The bravest or the most skilful of the warriors or hunters would desire to distinguish himself somewhat above the others by the possession of a weapon, not only more useful, but, in his eyes, more complicated, and more beautiful. The best shape for the weapon he has already determined by experience, and the enriching of its surface by carving naturally follows.

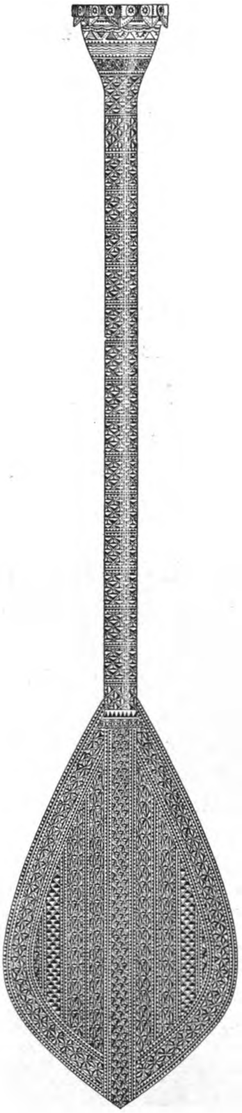


FIG. 2

The eye of the savage warrior is accustomed to the geometrical forms and details of the stamped cloths; his hand, therefore, attempts to imitate them in the handles of his wooden utensils by means of knife cuts, and the paddle shown in Fig. 2 illustrates how faithfully this representation has been carried out. This instrument is from New Zealand, and the taste exhibited in its carving would bear favorable comparison with the art works of the highest state of civilization. There is not a line on its surface misapplied; the general shape is most graceful and elegant, and the decoration is applied everywhere to best develop the form.

The New Zealander's instinct taught him that his paddle should be strong, not only in reality, but in appearance, and his decoration is so disposed as to give an appearance of strength greater than it would have had if the surface had remained undecorated. The band in the center of the length of the blade is continued around both sides, binding the border that extends around the edge, and this latter appears to hold in place all the other bands. Had these bands run out like the center one, they would appear to have a tendency to slip off, as the center one is the only one that can occupy its position around the end of the paddle with repose.

12. Applying Historic Motifs to Modern Designs.—It has already been pointed out that a study of historic styles is valuable only as it assists in cultivating good taste in the designer, and serves as a grammar of decorative motifs for application to modern uses. For this reason, there will be illustrated in this Section not only examples of historic styles, but also examples of applications of the particular styles that modern designers have found it practicable to adopt.

Obviously, one cannot make modern application of primitive or savage styles; because these were only formative, and there exists no reason why civilized peoples should use or adapt them. It is interesting to note, however, how some modern work—such as Indian and Mexican pottery, blankets, drawn-work, etc.—carries out some of the arbitrary inorganic forms observable in primitive decoration.

EGYPTIAN

13. Sources of Egyptian Design Motifs.—The types of Egyptian design motifs derived from nature were those of the lotus, the papyrus, and the palm. The most conspicuous type in Egyptian art is the **lotus,** a plant growing on the banks of the Nile and somewhat resembling the pond lily, but differing from it in coloring. It stands high out of the water, as shown in Fig. 3, with petals of a rich purple and a heart of deep orange. The lotus was a sacred flower, and as an offering to the gods was conspicuous in the highest forms of worship.

In Egypt, the lotus was used in a multitude of different forms in almost every decorative scheme throughout its history. In fact, it is difficult to conceive a characteristically Egyptian design that does not introduce some suggestion derived from this flower. The devotion of the Egyptians to this particular emblem amounts almost to worship. It was painted on their walls, mummy cases, and coffins; it was carved in their monuments, temples, and tombs; it was wrought in precious metals and worn as jewelry; it was woven in their linen garments, and in fact it was everywhere.

The **papyrus plant,** shown in Fig. 4, was also used largely in Egyptian art; it was associated with the Nile, on whose banks it grew, but not to such an extent as the lotus. It was the first material used to manufacture paper, which derives its name from this plant.

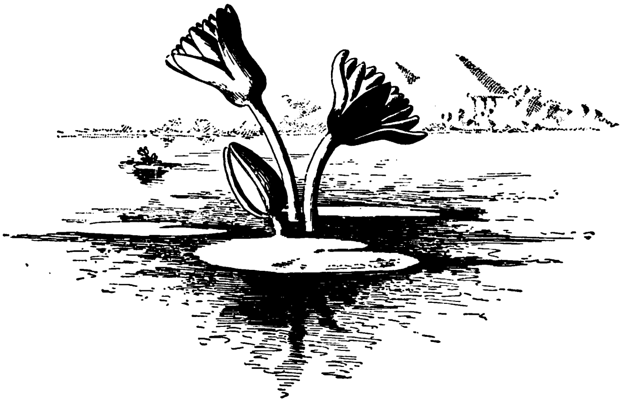


FIG. 3

Feathers presented another type frequently met with in ornament, and these, with some birds, particularly the vulture or buzzard; the asp, a small, venomous serpent; and the beetle, were about all the types borrowed from the animal kingdom.

The ornament known as the **winged disk,** Fig. 5, consists of a solar disk, supported on each side by an asp, the royal symbol of Upper and Lower Egypt. The wide outstretching vulture's wings symbolize the untiring activity of the sun in its beneficence; hence, a divine protecting power. It is sometimes varied to include the figure of a goddess or the body of a vulture, in place of the disk, and the wings are occasionally curved upwards.

The **scarabæus,** Fig. 6, consisted of a beetle holding a sun disk between its front feet and a small ball between its hind feet. It was identified with the rising sun, and was emblematic of creation and resurrection, or new birth. Its exact significance is somewhat complicated, as are in fact all Egyptian emblems; but, owing to the habits of the beetle, slowly developing from a grub through various stages to a full-grown insect it is emblematic of progress and evolution.

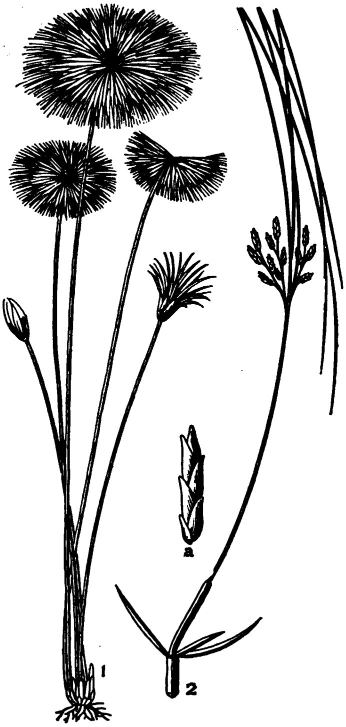


Fig. 4

14. Egyptian Motifs Applied in Designs.—Egyptian design motifs when applied in decoration were always severely conventionalized, and certain details, such as the lotus and papyrus, were represented in the strictest geometrical arrangement, usually showing the bud, blossom, and fruit in regular order, typifying the development of the entire plant.

In Fig. 7 observe the straight, stiff stem and trumpet-shaped blossom, the sharp-pointed petals of the calyx, and the geometrical arrangement of the entire plant, with all its distinguishing characteristics emphasized to produce the simplest and severest conventionalism.

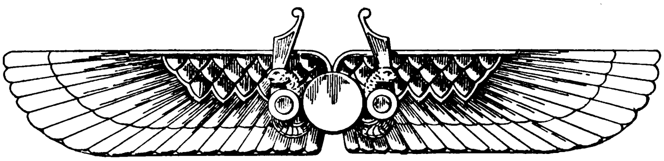


Fig. 5

In Figs. 8 and 9 are shown several characteristic wall decorations, wherein the lotus, papyrus, and other types are introduced in great variety, showing the changes that can be worked on a few ideas. These were introduced in the decorative schemes of the tombs and temples, and give a fair idea of the general wall treatment.

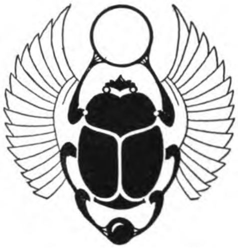


FIG. 6

The scroll borders in (*a*) and (*b*), Fig. 8, represent conventionalized waves of the Nile, and were frequently used in a multitude of forms as borders, or frames, to wall panels filled in with surface decoration.

The border shown in (*f*) is taken from a narrow frieze in one of the tombs. The lotus is here used in two forms, with a geometrical arrangement above and below. Another border, generally used in a vertical position, is shown in (*g*). Here the lotus blossom is introduced in the central strip, which is flanked on each side by a series of disks.

In (*c*), (*d*), (*e*), and (*h*) are shown forms of surface decoration that were used within the panels surrounded by the preceding, and many other designs of, borders. No type is traceable in (*c*) or (*e*), but in (*d*) and (*h*), the conventionalized lotus blossom is used four times in each circle. Egyptian surface decoration was always geometrical. The minor subdivisions were always circles, squares, spirals, triangles with straight or curved sides, or an interweaving of straight and curved lines, as in (*c*) and (*e*).

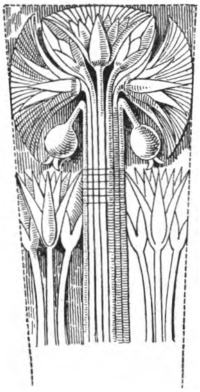
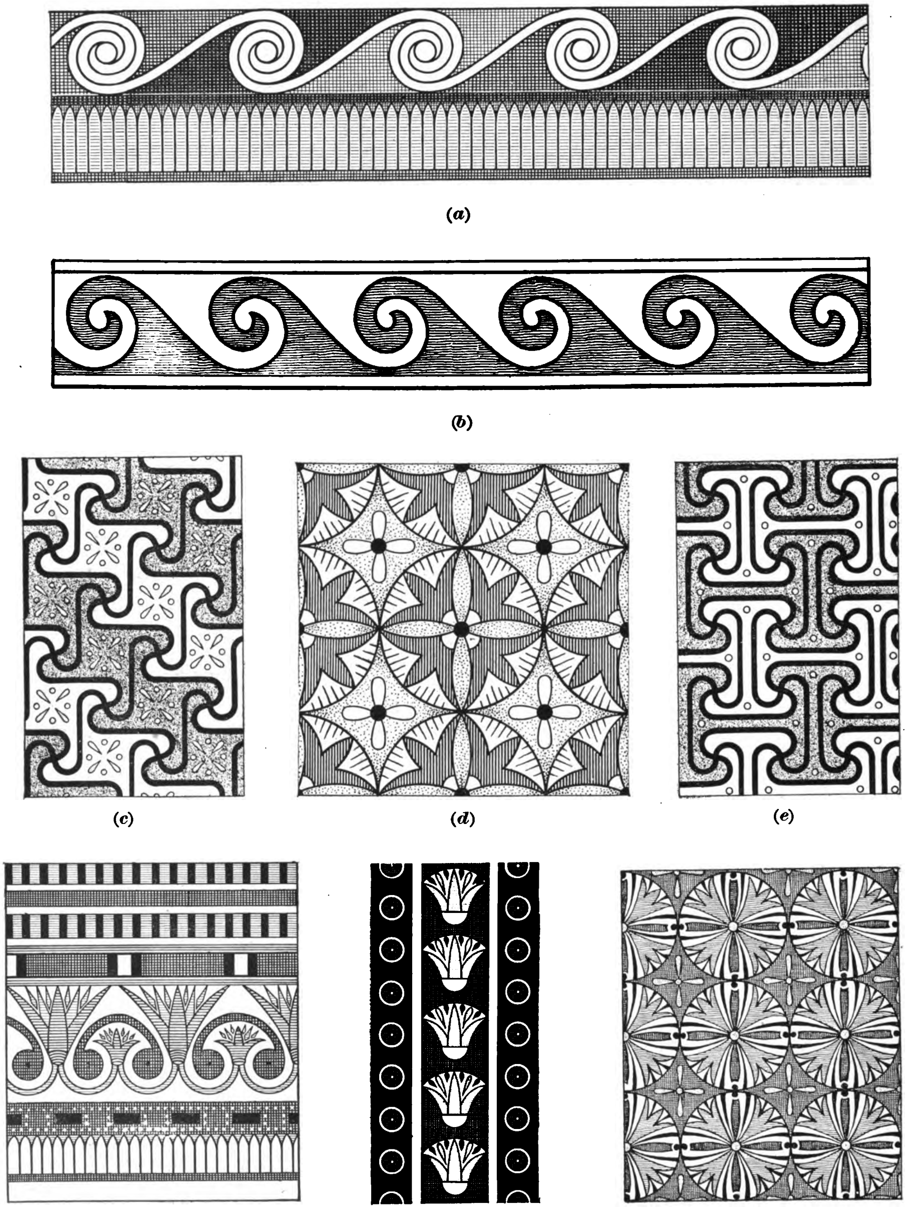


FIG. 7

The all-over patterns and borders shown in Fig. 9 give some idea of the color combinations used by the Egyptian artists. Here are found the same types that characterized all Egyptian designs, but used in many different ways, which give variety and charm to successive combinations of the same details. In (*a*) and (*b*) the predominating types are the spiral and the lotus

EGYPTIAN DECORATION



(a)

(b)

(c) (d) (e)

(f) (g) (h)

FIG. 8

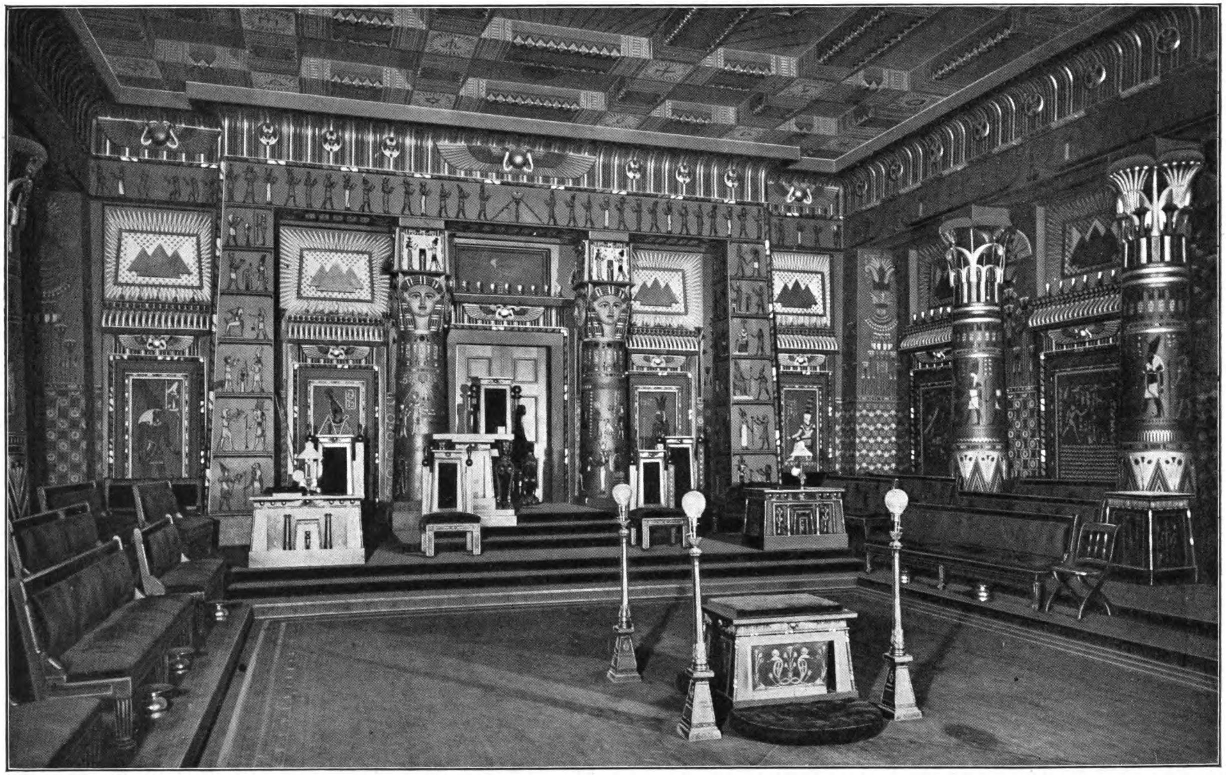


Fig. 10

blossom and rosette combined with the scarabæus in one case and a hieroglyphic inscription in the other; yet similar as are these elementary details, the decorative effect is entirely different. In (*c*), the spiral, lotus, and the rosette are again combined, and another design totally unlike the preceding is the result. Although the spiral is the only prominent element evident in (*d*), the inclosed form is undoubtedly derived from the papyrus. The border decoration shown at (*e*) is composed entirely of lotus buds and blossoms, arranged alternately. These are only a few of an almost endless variety of wall decorations based on these simple characteristic types.

15. Modern Application of Egyptian Designs.—The vast difference between the conditions of the civilization of the ancient Egyptians and that of modern Europe and America makes Egyptian designs of little use for modern work. Occasionally, however, with a few alterations, the Egyptian styles can be used in an appropriate place. One such instance is in the wall decorations and fittings of one of the lodge rooms of the Masonic Temple at Philadelphia, a photographic reproduction of which is shown in Fig. 10.

The effect of this style of design is solemn and impressive, and thoroughly in keeping with the mysterious rites of an ancient secret society. Note the emblems that have been worked into the decorative details of the wall panels, altar and desk fronts, chair backs, etc. All is in harmony with the Egyptian style and at the same time in keeping with the purpose of the room. There is scarcely an element of the Egyptian style that does not find a place in this decorative scheme, and when seen in the full glory of its color effect, it is magnificent and imposing.

In Fig. 11 is shown a modern lighting fixture, with a distinctly modern adaptation of the Egyptian style. This is a wall bracket having the wall panel, or back, ornamented with a winged asp (see Fig. 5 for the historic form), from behind which grow up the stems that support the electric candles. The husks and sockets of the candles are expressed in lotus leaves and buds, respectively. (See Figs. 7, 8, and 9, for various historic forms of the lotus.) Directness, simplicity, and

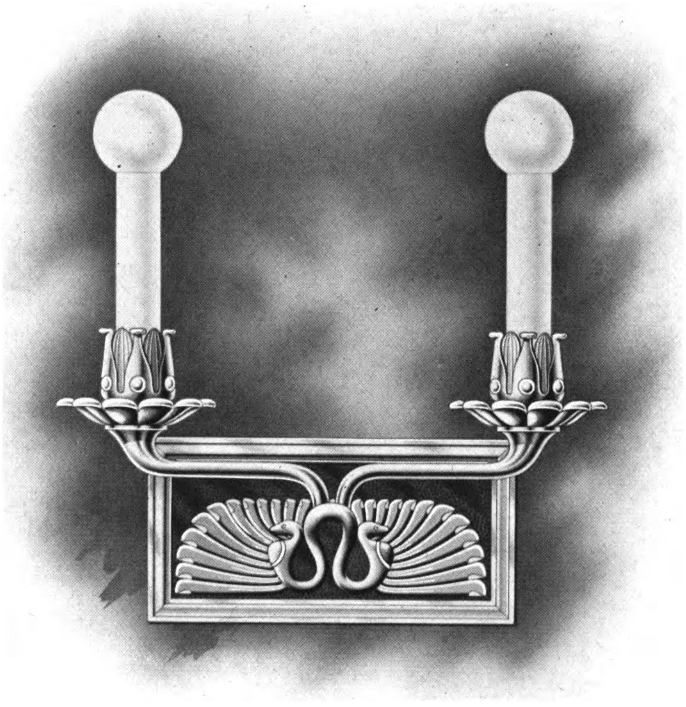


FIG. 11

severity are well expressed in this design, and suggest an atmosphere of symbolism and mysticism peculiar to all Egyptian work.

These examples in Figs. 10 and 11 show clearly how the Egyptian style is adapted to modern designs.

ASSYRIAN

16. Source and Characteristics of Assyrian Motifs. The design motifs of Assyria were borrowed in part from Egypt, as there are many points of resemblance in the two styles.

The Assyrian style is not based altogether on the same types as the Egyptian, but is represented in the same way. In both styles, the decoration appears in relief, as well as painted, in the nature of hieroglyphic diagrams. With the exception of the pineapple, and the adaptation of the Egyptian lotus, the Assyrian style does not seem to be based on any natural type, and the natural laws of radiation and tangential curvature that we find in the Egyptian style are, in the Assyrian, observed more as a traditional or borrowed idea rather than an instinct of the people themselves.

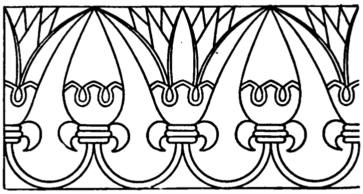


FIG. 12

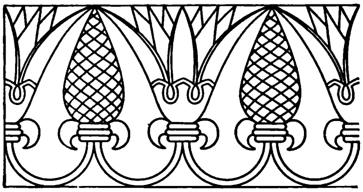


FIG. 13

17. In Fig. 12 is shown the Assyrian rendering of the Egyptian lotus, and, in fact, this border, which comes from Persepolis in Assyria, might easily be considered an attempt to copy an Egyptian example. Fig. 13 shows another example of the lotus motif from the same city in Assyria, wherein the detail is almost identical with Fig. 12, but the lotus bud between the two blossoms is replaced by a device representing the pineapple—a fruit that was sacred in Assyrian art. The close resemblance of these forms to those seen in Egypt is almost indisputable evidence that they were derived from the latter country, and the rosette form shown in Fig. 14, while it appears frequently in borders of the Assyrian style, must undoubtedly have been developed or adapted from the Egyptian device shown in Fig. 8 (*d*). A still cruder adaptation of the Egyptian lotus to carved decoration in Assyrian work is seen in Fig. 15, wherein the surface of the petals is simply indented in a harsh, crude manner, and the outline is carved into seven pointed terminations of the leaves. The use of this motif in borders, in combination with another crude device, is shown in Fig. 16, wherein the outline of the lotus-derived figure shows a little more refinement, as its lines are more gracefully curved, but where the connecting lines between it and the interposed device are arcs of a circle, making the entire composition crude and inartistic. The circular forms with the three-leaved blossom on top may be representative of pomegranates, the designs of which were used largely in Assyrian decoration. However, it is of little importance in itself what types were used in this art. The lotus and rosette were undoubtedly borrowed from Egypt; the latter, both as shown in Fig. 14, and modified in Fig. 16, is easily traceable to designs seen on the banks of the Nile. The relation of Egyptian and Assyrian motifs is thus a close one.

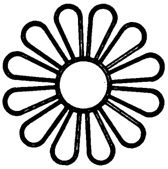


FIG. 14

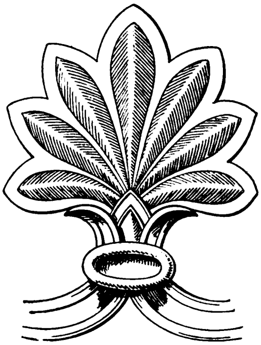


FIG. 15

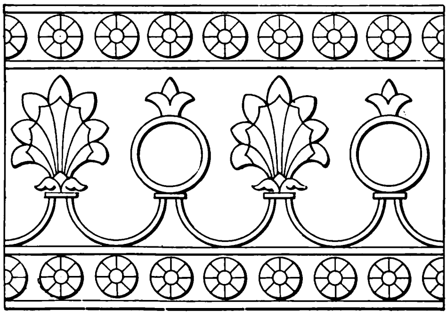
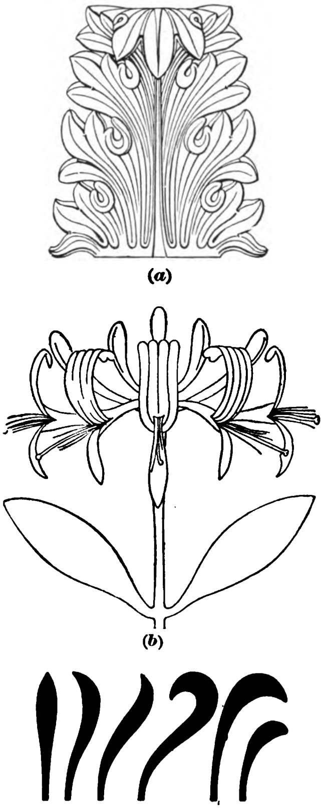


FIG. 16

GREEK

18. Sources of Greek Design Motifs.—The types on which Greek designs are based are few, and the renderings are so conventional that it is difficult to recognize in many cases from what particular type the motif was derived. The geometrical fret pattern, as shown in Fig. 20 (*e*) and (*f*), is used frequently, and is undoubtedly derived from an Egyptian source, as is also much of the foliated design work indicating a modified rendering of the conventional lotus.


(*a*)
(*b*)
(*c*)
Fig. 17

The **acanthus** leaf is the first new type that is met in Greek designs, and it appears on the capitals of the columns and on much of the painted decoration. Fig. 17 (*a*) shows the acanthus in its conventionalized form. In the case of the forms referred to as the **honeysuckle** motif there is much question as to whether these forms were derived from the conventional rendering of the honeysuckle bud, or from an adaptation of certain lotus forms in single brush strokes. The conventionalized honeysuckle blossom is shown in Fig. 17 (*b*). It requires some imagination to believe that the graceful strokes of the honeysuckle motif bear any relation to the plant itself, and it is far easier to assume that these are the outcome of brush-stroke renderings of lotus forms. In Fig. 17 (*c*) are shown six strokes made with a brush and black paint as described when plant forms and their conventionalization were studied. The point of the brush is first touched to the paper, and as pressure is increased, the bristles spread out and then come together again when the pressure is released, thus giving the stroke the forms shown. Variations of these six strokes constitute the principal elements of all painted Greek designs and some of the carved work. The influence of this stroke is particularly traceable in Fig. 17 (*a*), (*b*), and (*c*), and will be found also in subsequent examples.

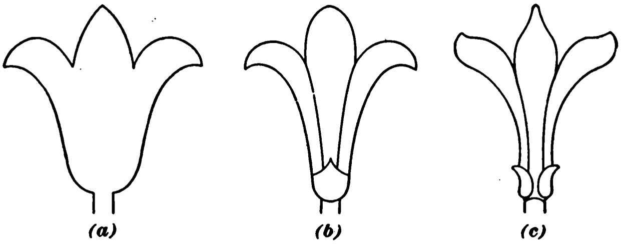

(*a*) (*b*) (*c*)

FIG. 18

Although many examples of Greek decorative work were originally executed in stone, the graceful form of the brush-stroke is evident in practically all of them.

The same may be said of the **Greek lily**, Fig. 18 (*c*), which may have been derived from the lotus form (*a*) and (*b*). The **anthemion motif**, Fig. 19, consists of the honeysuckle form enclosed in an elliptical outline.

19. Greek Motifs Applied in Designs.—In Fig. 20 are shown typical examples, in color, of Greek decorations found on painted vases. In (*a*) is shown the honeysuckle alternated with a simple form of the Greek lily; in (*b*), the anthemion designed to form a border, or stripe; in (*c*) and (*d*), rosette forms, which may have been borrowed from Egypt, as may also the wave design shown in (*g*). The fret forms at (*e*) and (*f*) are characteristic of Greek geometrical motifs. The fret is one of the most ancient forms of design work known. It was probably

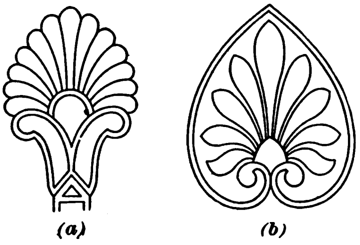
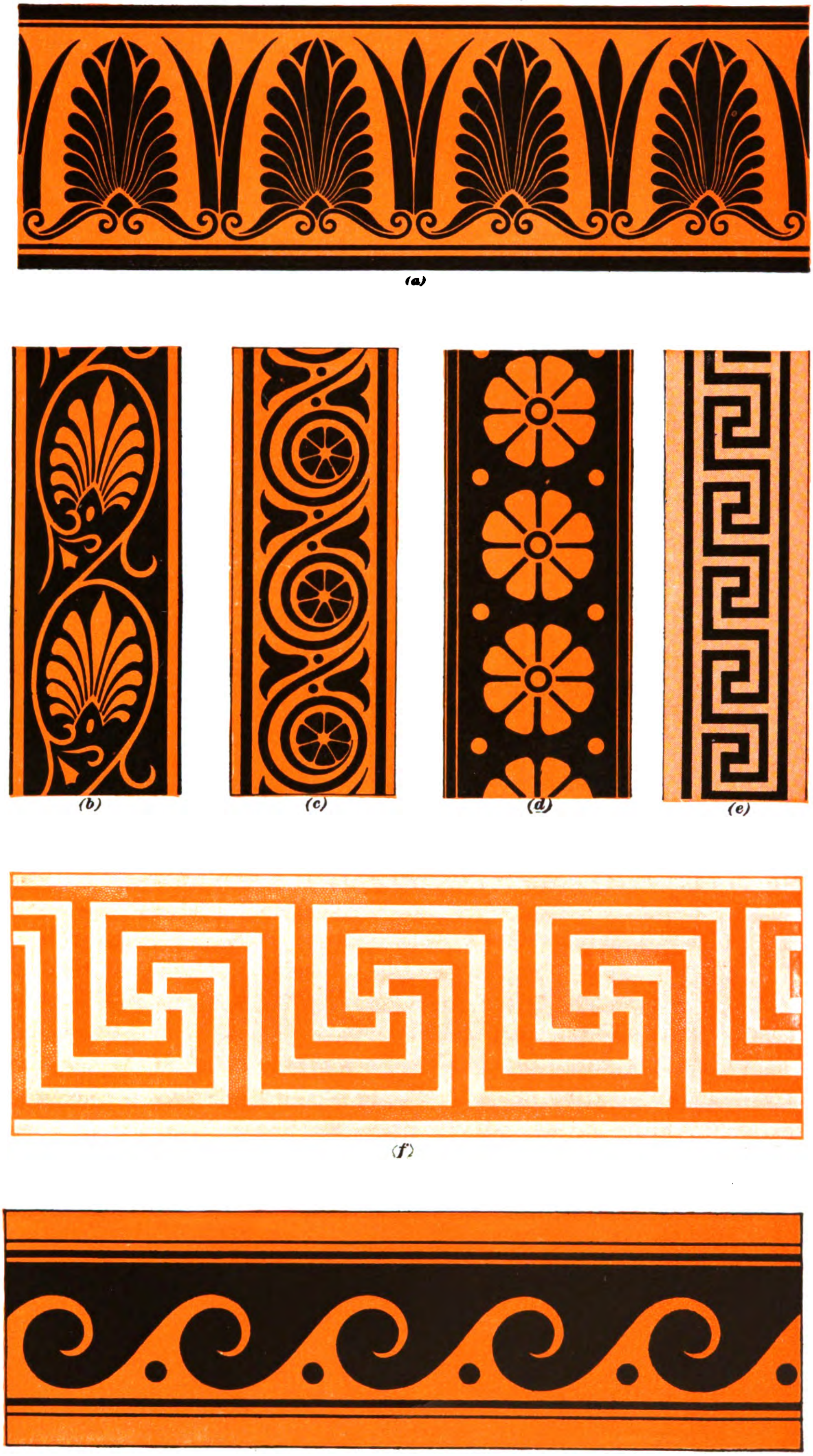

(*a*) (*b*)

FIG. 19

GREEK DECORATION



(a) (b) (c) (d) (e) (f) (g)

FIG. 20

GREEK DECORATION

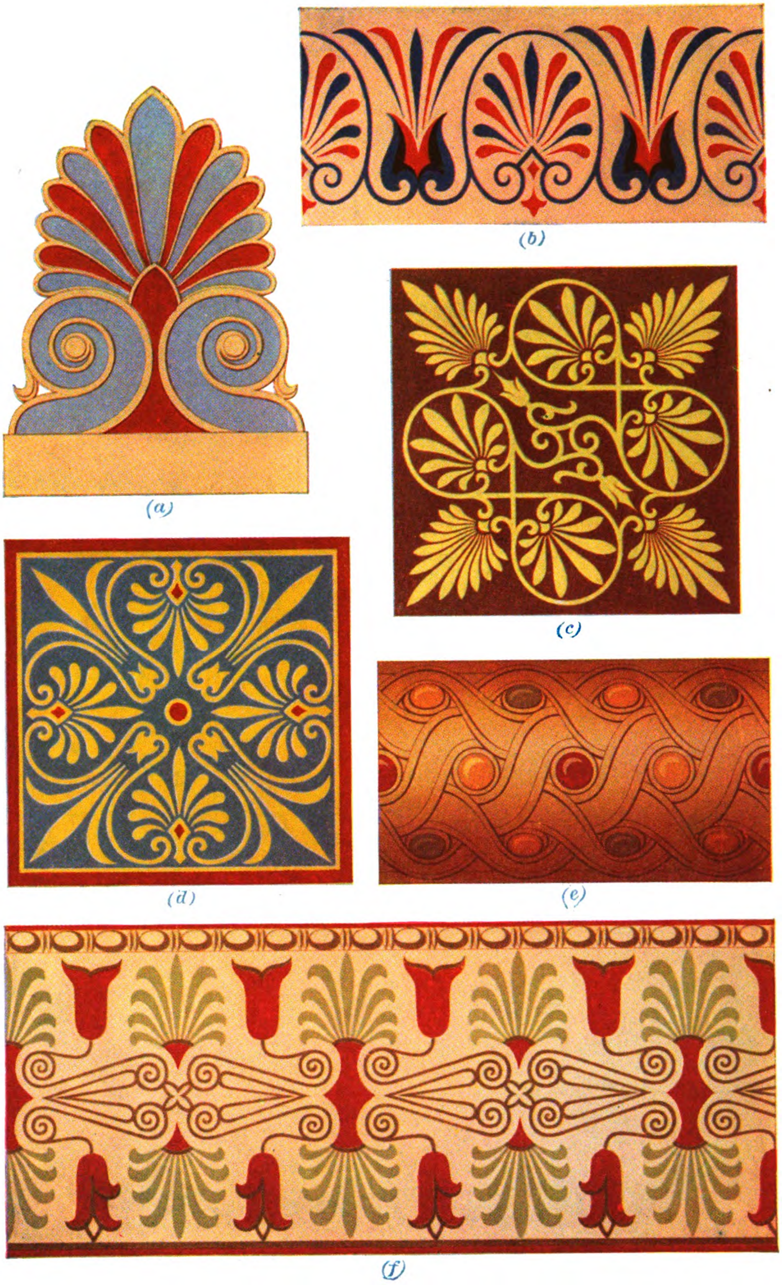

(a) (b) (c) (d) (e) (f)

FIG. 21

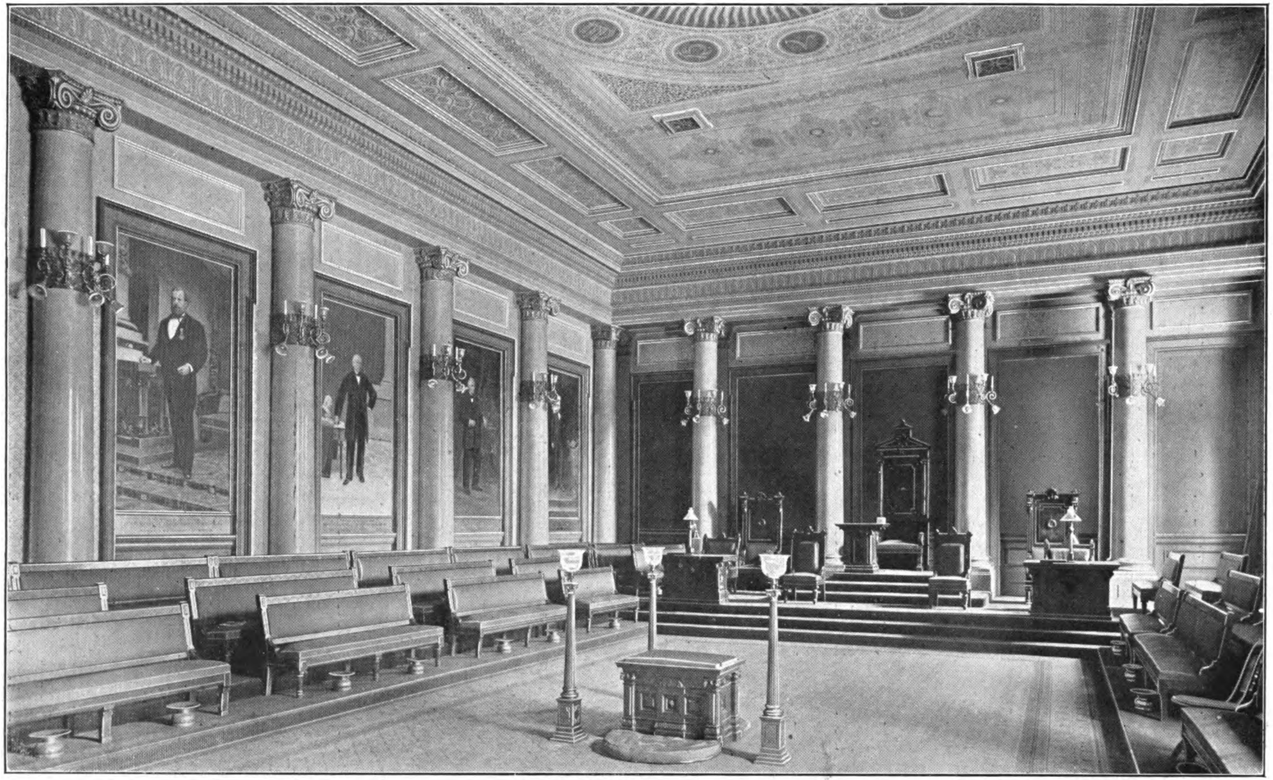


Fig. 22

derived from patterns formed by laying bricks in two colors. In the best patterns, the two outlines formed by the two colors are identical and fit one within the other.

In Fig. 21 (*a*) is shown a painted ornament based on the honeysuckle motif; in (*b*) and (*f*) colored borders, introducing the honeysuckle; and in (*c*) and (*d*), ceiling decoration. In (*e*) is shown a decorated molding showing colors used on that member when buildings were painted.

The reproductions in colors of typical Greek decorative work, as shown in Figs. 20 and 21, should prove of great value for reference, for the colors are accurate and authentic, and can be used by the student direct.

20. Modern Applications of Greek Designs.—In the case of the modern application of the Greek style the extent to which it is applied is considerably greater than in the case of the Egyptian. The fret, or key, design, and also the honeysuckle design, are used extensively for borders for stencil decoration of frescoed walls of public buildings, banks, vestibules, bathrooms, etc. Likewise it is employed in tile designs for the same purposes. Further, in the interior decoration of public rooms in the Greek style, as in the case of the one shown in Fig. 22, Greek decorative motifs are combined with the details of the structural portions of the interior decorations. A careful inspection of Fig. 22 will reveal the honeysuckle motif in the frieze above the capitals of the columns, the anthemion, or brush-stroke, motif on the ceiling, etc., all being carried out literally as illustrated in the historic forms shown in Figs. 20 and 21.

ETRUSCAN

21. Characteristics of Etruscan Motifs.—In addition to being skilful as builders, having introduced the arch into the construction of public buildings among the Romans, the Etruscans were particularly deft in ceramics and goldsmithery, and, though the character of their designs bears a strong resemblance to those of Egypt and Greece, their style was unique, and was developed on independent lines. In designs and

ROMAN POMPEIAN DECORATION

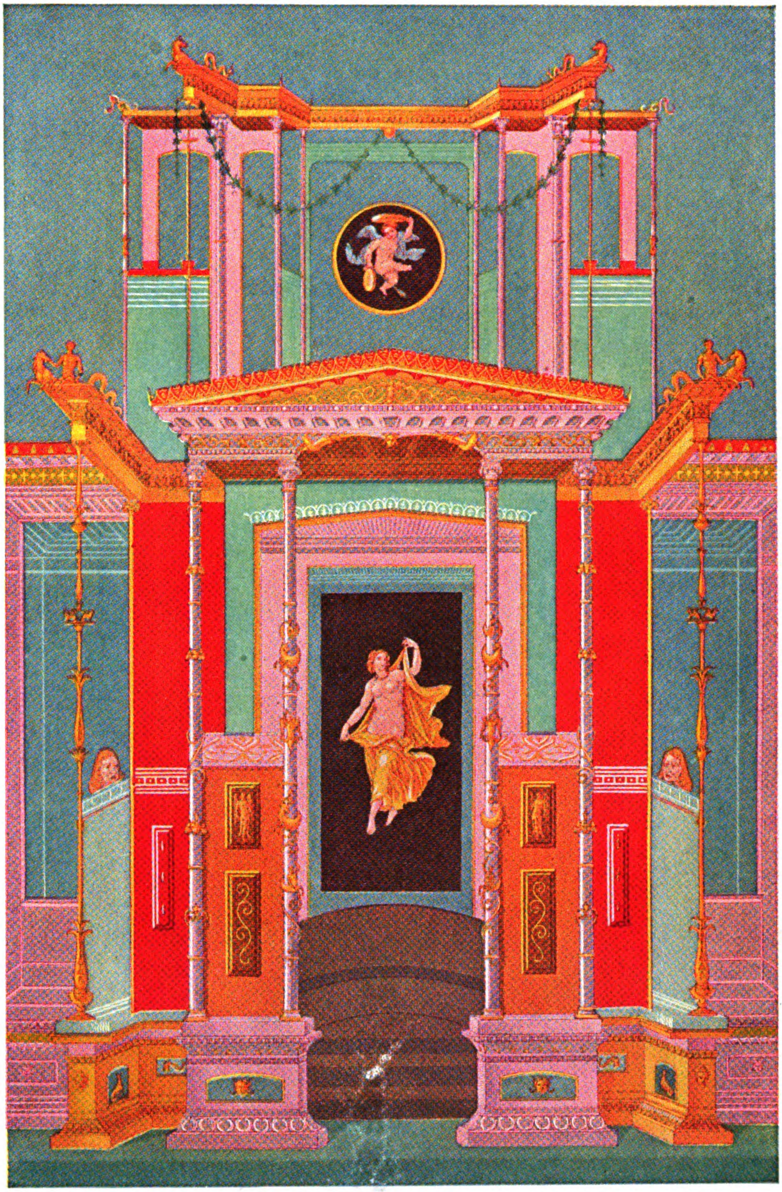


FIG. 25

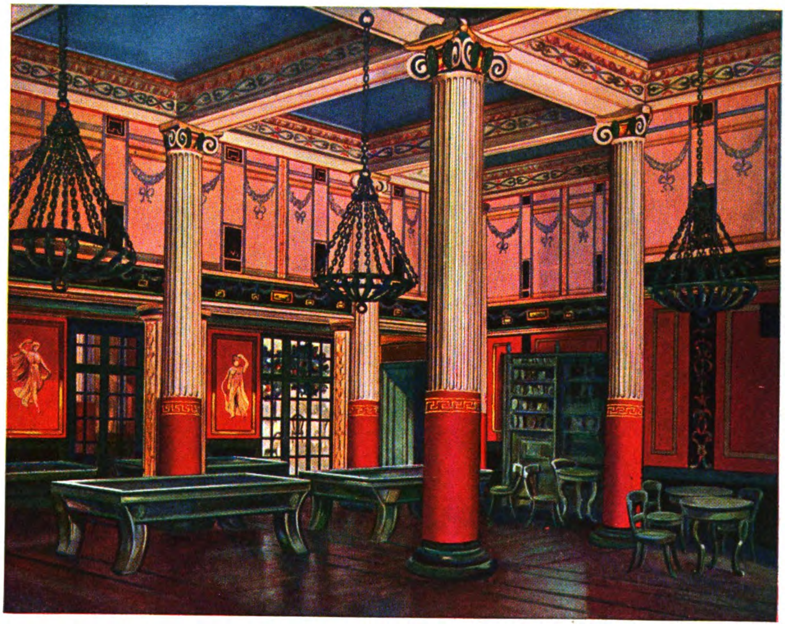


FIG. 26

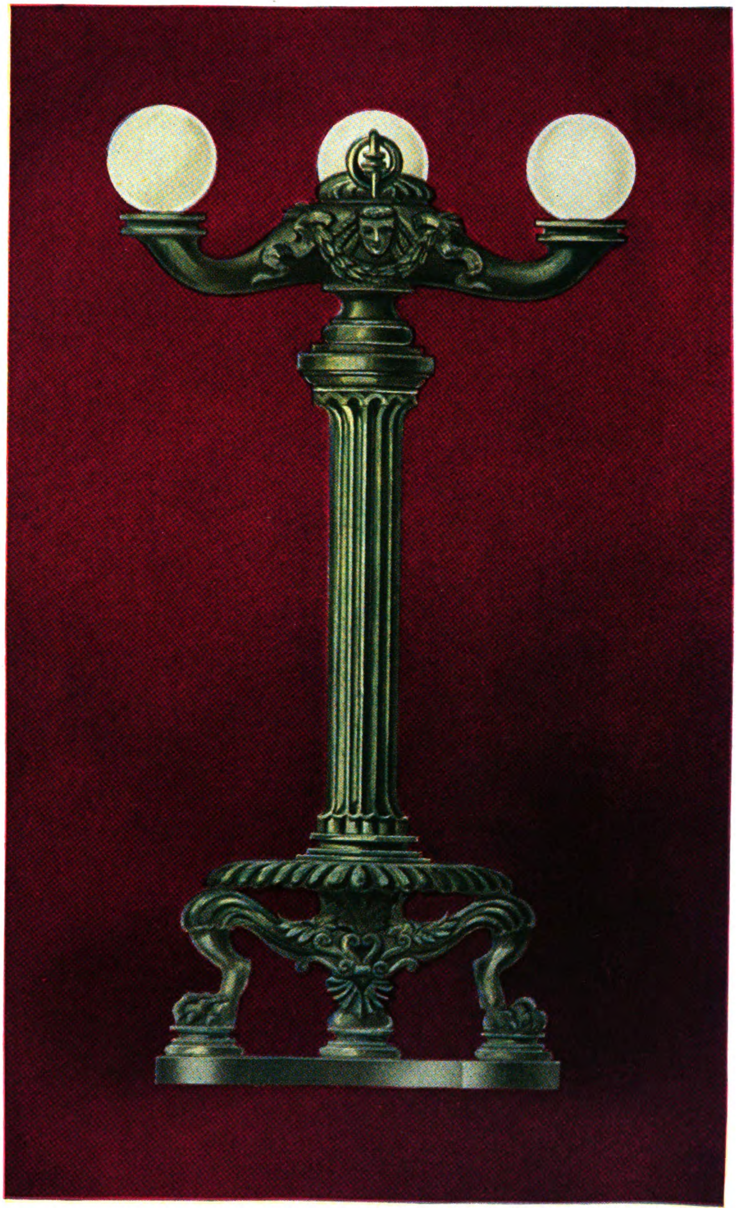
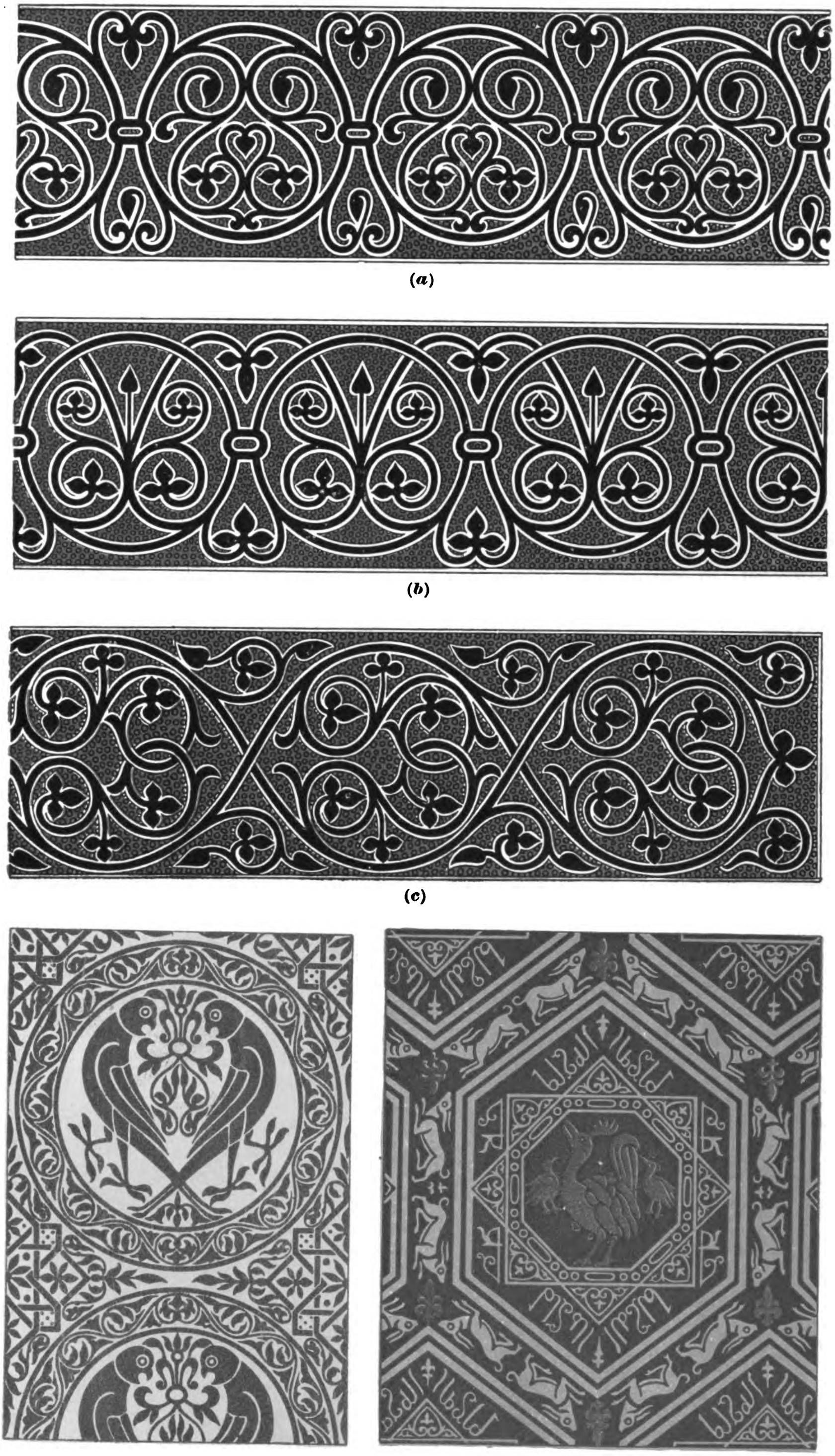


FIG. 27

BYZANTINE DECORATION



(a)

(b)

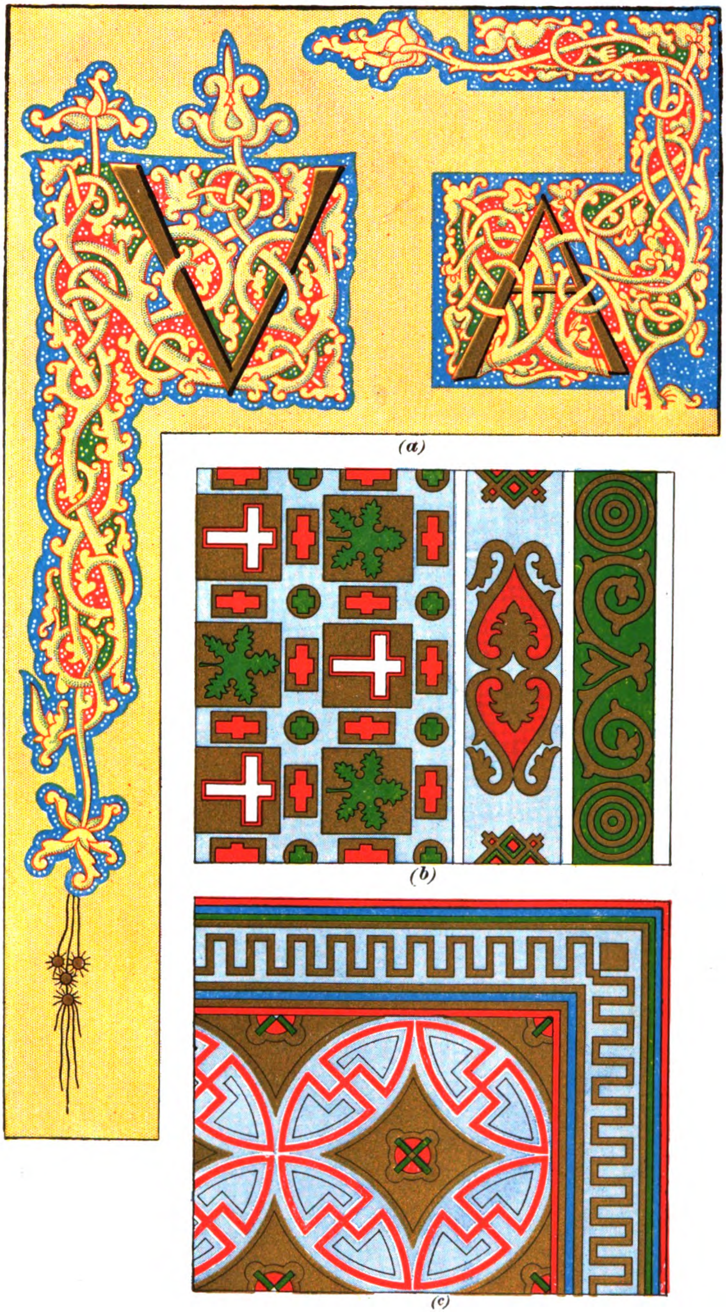
(c)

(d)

(e)

FIG. 35

BYZANTINE DECORATION



(a)

(b)

(c)

FIG. 36

MOORISH DECORATION

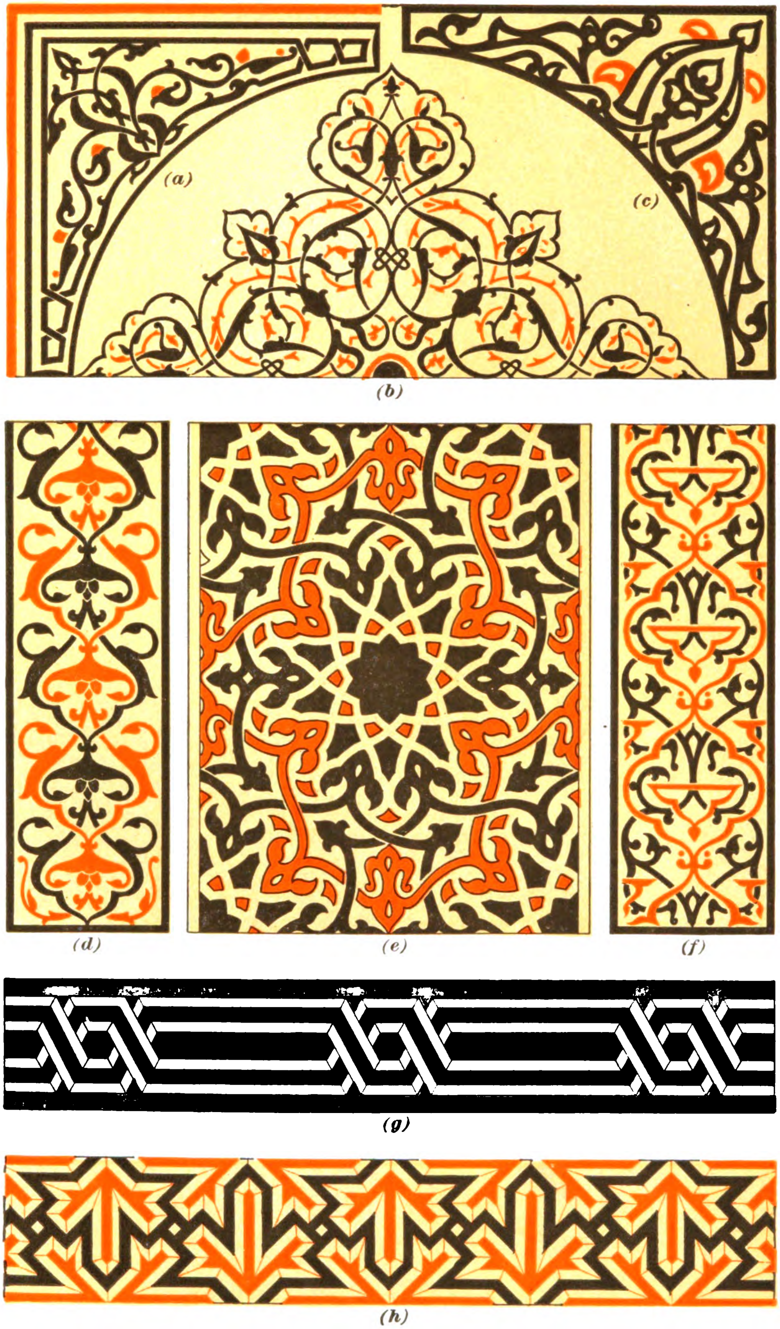
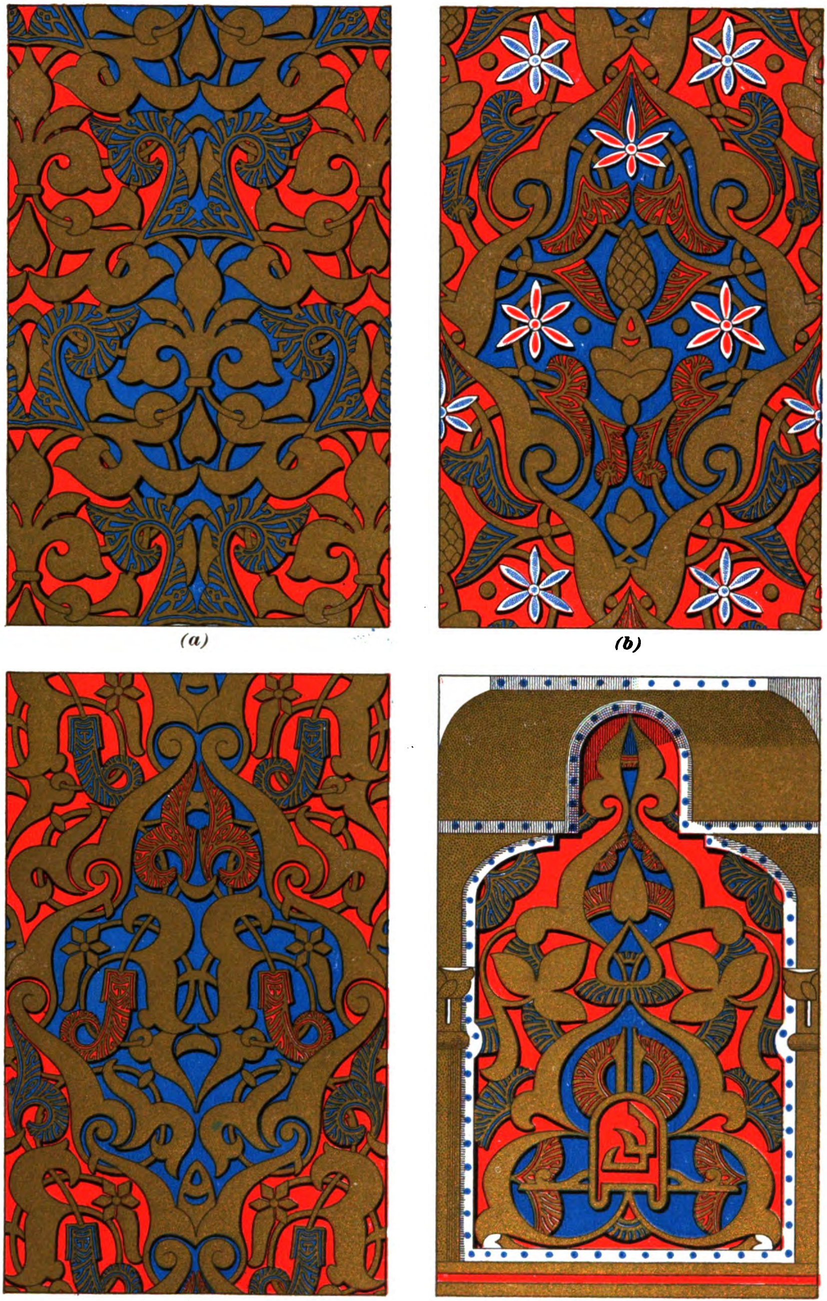


FIG. 38

MOORISH DECORATION



(a)

(b)

(c)

(d)

FIG. 39

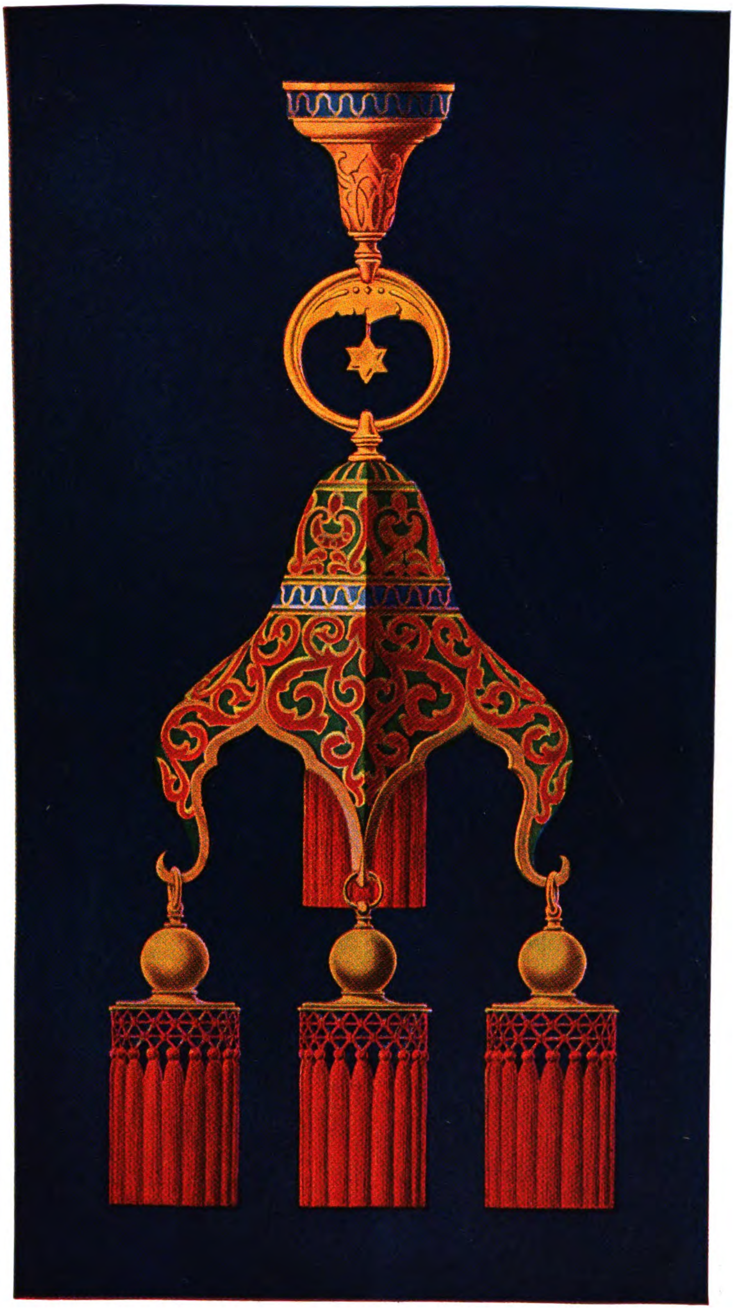


Fig. 41

workings for jewelry they were original and skilled, and Etruscan jewelry was much sought, even in artistic Greece. Under their skilful hands every conceivable object was worked into the design. Flowers, fruits, figures, vases, cornucopia, rose work, crescents, ellipsoidal balls, and chains of all sorts and sizes found a place in their jewelry designs.

They used the emerald a great deal more than any other of the precious stones, on account of a superstition that it possessed medicinal qualities, but pearls, glass paste, cameos, and intaglios were used also, and the variety and taste in this line of design work exceeded that of any other nation.

22. There are many objects of Etruscan design that are still considered masterpieces of art; and diadems, crowns, necklaces, ear drops, bracelets, hairpins, and rings are still designed on the lines originated by the Etruscan goldsmiths. The scarabæus is frequently introduced in these designs, and is sometimes used as a link to unite two parts. In fact, this device appears so frequently in their jewels, utensils, sword hilts, etc. that it would appear probable that the Etruscans worshiped this insect, or associated it with some superstitious idea. The scarabæus of the Etruscans differed materially from that of the Egyptians, inasmuch as it was usually carved of precious stone, or metal, whereas the Egyptian device was most frequently painted, though in many cases it was worked in metal and worn as a ring or other piece of jewelry.

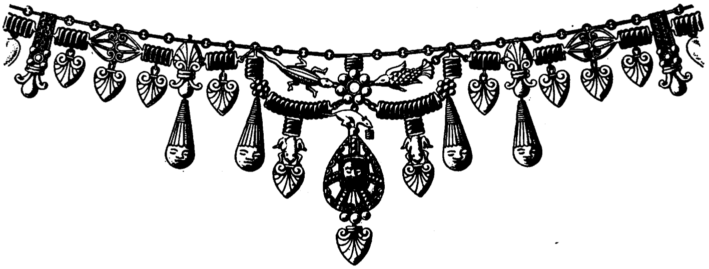


FIG. 23

In Fig. 23 is shown a necklace, the centerpiece of which consists of an elaborate piece of goldsmith's work, set with precious stones, the central stone being a large emerald carved in the form of a face. The connecting links of the chain are designed in gold with intermittent precious stones. This is characteristic of the Etruscan style. Only one illustration is introduced here, as it is simply necessary to consider Etruscan art briefly, in order to preserve the thread of history, that we may better understand the influence of these people on the art of Rome.

ROMAN

23. Classification and Sources of Roman Motifs. Under the general term *Roman* may be included the styles known as *Græco-Roman*, *Pompeian*, and *Classic Roman*. However, considering the Roman style broadly, it is a difficult matter to find original types in Roman decoration. Most of their ideas were borrowed from Greece and were adapted to their particular purpose. In their carved work there is found less conventionalism than is characteristic of the Greeks, and a stronger tendency to favor elaboration. The acanthus was much used in scroll patterns and on the capitals of the Corinthian and composite orders, but the scroll patterns never presented the refinement of the Greek. Instead of a parent stem from which radiated offshoots, the Roman motifs consisted usually of one scroll growing out of another scroll and ending in a flower, as shown in Fig. 24.

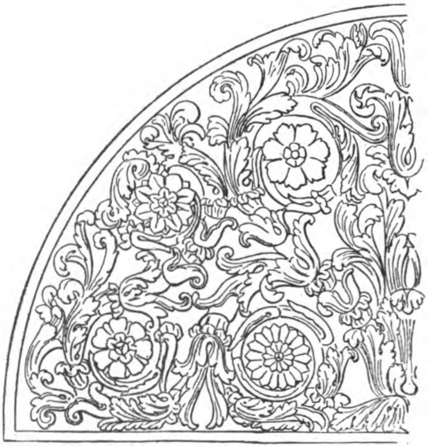


FIG. 24

The amount of design that can be obtained by working on this principle of using the Roman acanthus leaf, namely, of leaf within leaf and over leaf, is very limited. It was not until the principle of one leaf growing out of another in a continuous line was abandoned, and its place taken by a continuous stem throwing off details on each side, as shown in Fig. 24, that pure conventional design work received any development.

24. The Roman Pompeian Style.—Although not strictly Roman in style, the Pompeian wall decorations and mosaics must be considered part of the Roman period. Pompeian wall decoration, an example of which is shown in Fig. 25, consisted of a panel treatment wherein the wall was usually subdivided into three parts, corresponding to the pedestal, the column, and the entablature of the orders. The colors were rich and the subjects exceedingly conventional. Representations of villas and balconies in perspective were very common, as was also the introduction of figures, dancing girls, etc., somewhat after the Greek style. The colors used were very brilliant, red and black being used profusely for purposes of contrast. The pictures on the walls were frequently framed with architectural details consisting of slender shafts and delicate entablatures, which were nearly always rendered in a crude form of perspective. Pompeian decoration may be considered as a reflection of painted decorations that could be found in the Roman baths and other public buildings. This is a style that is more characteristic of Pompeii and one that does not associate with Roman art, as all of its elements are far too delicate to be suggestive of the elaborate and ostentatious decorations that must have adorned the walls of Roman buildings.

Besides decorative painting at Pompeii, we find a more or less imperfect polychromatic coloring in mosaic. This branch of Roman art, therefore, became subjected to serious modifications. The Romans already possessed a rudimentary knowledge of mosaic work and they now received examples of it from the hands of the Greeks, in a more advanced state; but the inherent love of luxury in wealthy Rome, and the general contempt for matters of expense, caused the taste for mosaic work to increase and acquire real progress.

25. Modern Applications of Roman Designs.—In the modern application of historic style, designers are permitted to take considerable liberty with the details of the style in order to fit it to conditions of modern times. In fact, in many cases a mere idea can be worked up according to ancient precedent and then carried out along modern lines, in which there is scarcely any parallel between the modern design and the ancient example that may have given rise to it.

A design is shown in Fig. 26 (*a*) which illustrates a billiard room in Pompeian style. The effect here is obtained by dividing the wall into two horizontal bands, the lower one of which is subdivided into broad, red panels. Painted on these panels are graceful figures of dancing girls, similar to those found on Greek vases, while the characteristic Greek fret is used as a border. The upper section of the walls is divided by alternate wide and narrow panels of a lighter tone of red, and, between these, light festoons of flowers are painted under a narrow frieze. The columns are of Roman Ionic, with the lower third harmonizing in tone with the lower side walls and the upper two-thirds rendered as in stone. On the lintel, or architrave, above the capitals, is painted Greek foliated decoration. The chairs and small service tables are pure Greek in design, and the billiard tables are modeled to follow the same lines.

A further specimen of the modern application of the Roman style, with a Pompeian influence, is shown in Fig. 27, where a three-light standard, or candelabrum, designed in the Roman Pompeian style, is shown.

ROMANESQUE

26. Source of Romanesque Motifs.—The Romanesque style, being transitional between the classic Roman and the Byzantine, has little that will interest the modern decorative designer. The acanthus was used, as in the Roman style, the serrations of the leaves being sharp pointed, and with prominent and vigorous stems. The Romanesque style was simple in its motifs and arrangement, being heavy and coarse in general effect, but not ungraceful. Animal forms were sometimes used, sometimes very realistic, and at other times conventional and grotesque.

The borders in Figs. 28 and 29, and the all-over patterns in Figs. 30 and 31 illustrate far better than could be done by verbal descriptions the characteristics of the Romanesque style.

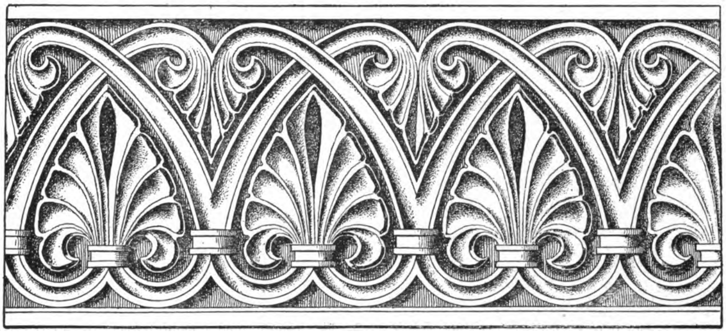


Fig. 28

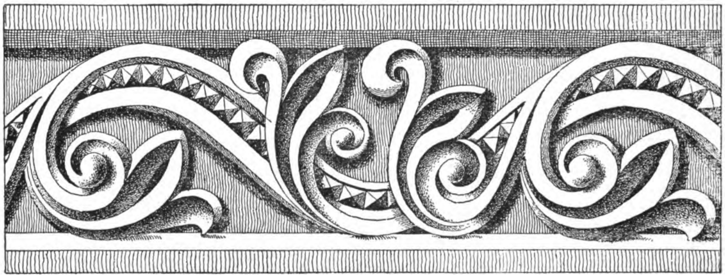


Fig. 29

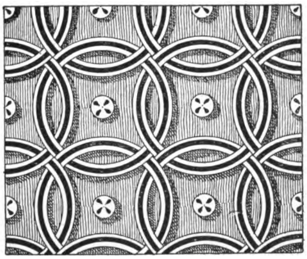


Fig. 30

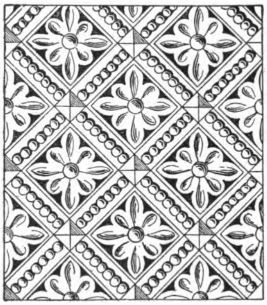


Fig. 31

BYZANTINE

27. Source of Byzantine Motifs.—The Byzantine style was a gradual development from the Roman and the Romanesque styles, being influenced by Assyria and Persia; that is, thus securing an Oriental influence. Thus a new style of art was developed, known as *Byzantine*. The old Roman forms became obsolete and gave place to new forms, original and beautiful.

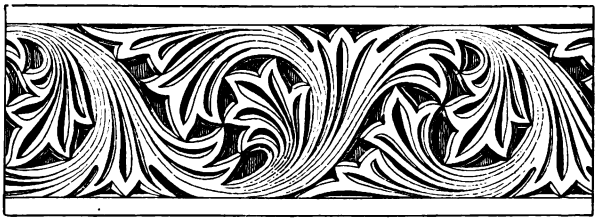


FIG. 32

The example illustrated in Fig. 32, showing the leaf form, is thoroughly conventional, and, though tending slightly toward a scroll, is governed by a continuous wavy line, from opposite sides of which the leaf forms branch.

Fig. 33 is an example of geometrically arranged design. The main geometrical forms, as will be observed, are circles, but these circles are not formed complete in themselves, but result from the crossing and intersection of two wavy lines precisely the same in general character as the wavy line that forms the

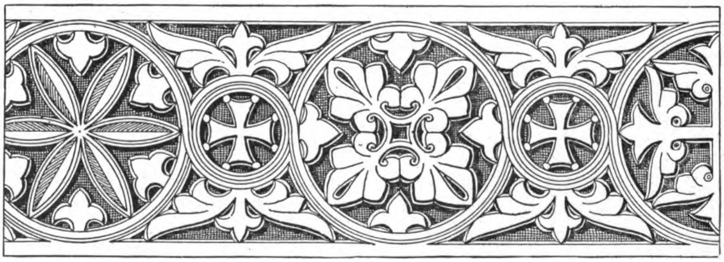


FIG. 33

governing element of Fig. 32. Instead of branching foliage from opposite sides of the lines, in the latter case, however, geometrical figures are arranged within, and foliated forms that have the cross of St. George for their guiding element are used to form prominent details of the design.

The example in Fig. 34 is that of part of a wall decoration between two arches. Tracing the outline of this running surface design, it will be observed that the same wavy line governs its principle and direction as in the case of Fig. 32; but a close study shows that the branching of leaves from one side is accompanied by a branch from the opposite side, so near that the general feeling is of a scroll growing out of a scroll, as in the classic Roman style.

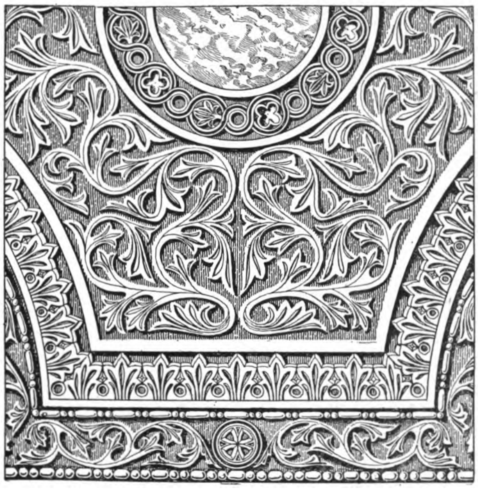


FIG. 34

One of the strongest characteristics of Byzantine decoration, compared with the classic, is that the design seems to be *cut into* the surface instead of being applied to it, the general surface always remaining flat, and the pattern so cut as not to break its outline.

28. Byzantine Motifs Applied in Designs.—Color in Byzantine design work was a very important factor, as the walls of the churches were richly overlaid with mosaics and frescoes in which the color theme was most magnificent. Gold was largely used for backgrounds and took the place of yellow, while the other two primaries, red and blue, formed a part of the theme.

The gold-and-black borders shown in Fig. 35 (*a*), (*b*), and (*c*) are characteristically Byzantine both in their geometrical construction and color contrasts. The three-leaved sprig conventionally and symmetrically introduced with the circle is a very simple combination that has been endlessly varied in different designs. It will be well to study the borders in (*a*) and (*b*) carefully and to observe how similar they at first appear, and yet on careful scrutiny how materially they differ. The border in (*c*), being absolutely symmetrical, can be used to advantage both in a vertical and in a horizontal position. These interlacing forms, based on tangent and intersecting circles, formed an important element in the elaborate illuminated manuscript designs of this period.

In (*d*) is shown a wall decoration in gold against a buff ground. The design is worked out in the flat with extreme conventionality, still introducing the circle as the unit of repetition. The decoration in (*e*) is a late example in which the hexagon is used as the unit of repetition.

Fig. 36 (*a*) shows initial letters with proper accompanying decoration in this style.

In (*b*) is shown an example of wall decoration in the same style. The effect is very rich, and the arrangement of the rectangles and smaller circles shows a knowledge of surface division that is well carried into effect. The coloring is Byzantine, and worthy of careful study. Though brilliant, it is never glaring; the hues are selected to harmonize and to produce a soft bloom effect at a distance.

In (*c*) is shown an example of ceiling decoration from the church of St. George, at Thessalonica. The peculiar outline of the device adjacent to the four sides of the interior rectangle is suggestive of Arabian origin, and is exceedingly ingenious in its method of preserving symmetry and preventing awkward repetition.

MOORISH

29. Sources of Moorish Motifs.—The Moorish style is sometimes classed with other Oriental styles, such as Arabian, Indian, Persian, etc., and referred to as *Saracenic* or *Moslem ornament*, thus giving it a tribal or religious classification. It will be less confusing, however, to the student of design, to refer to it as *Moorish*.

In the Moorish style, the artist was limited to the use of inanimate and non-vegetable types, owing to the restrictions of the Koran. Thus there came to be used geometrical patterns of great intricacy and all-over patterns in endless variety. In Moorish art the decoration arises naturally from the construction, and the constructive idea is carried out in every detail of the decoration of the surface. In decorative schemes, the general forms were first cared for; these were subdivided by general lines, the interstices of which were then filled with decoration that was again subdivided and enriched for closer inspection. The Moors carried out this principle with the greatest refinement, and the harmony and beauty of all their decorative work derived their chief success from this observance; their main divisions contrasted and balanced perfectly. The detail never interferes with the general form, and, when seen at a distance, the main lines strike the eye and the fine detail disappears; nearer approached, more detail comes into the composition, and, on close inspection, all detail of the surface appears as a grand powdering of decoration.

No matter how much the whole decorative work of the Moors is disguised, it is all constructed geometrically. Their fondness for geometrical forms is evinced by the great use of mosaics, in which their imagination had full play. However complicated may be their patterns, the mosaics are all extremely simple when the principle of setting them is once understood. They all arise from the intersection of equidistant sets of lines around fixed centers. In Fig. 37, at (*a*) and (*b*) are shown typical examples of Moorish strapwork patterns on a geometric basis, as well as the method of drawing the construction lines. In Fig. 37 (*a*) is shown an interlaced pattern consisting

MOORISH DECORATION

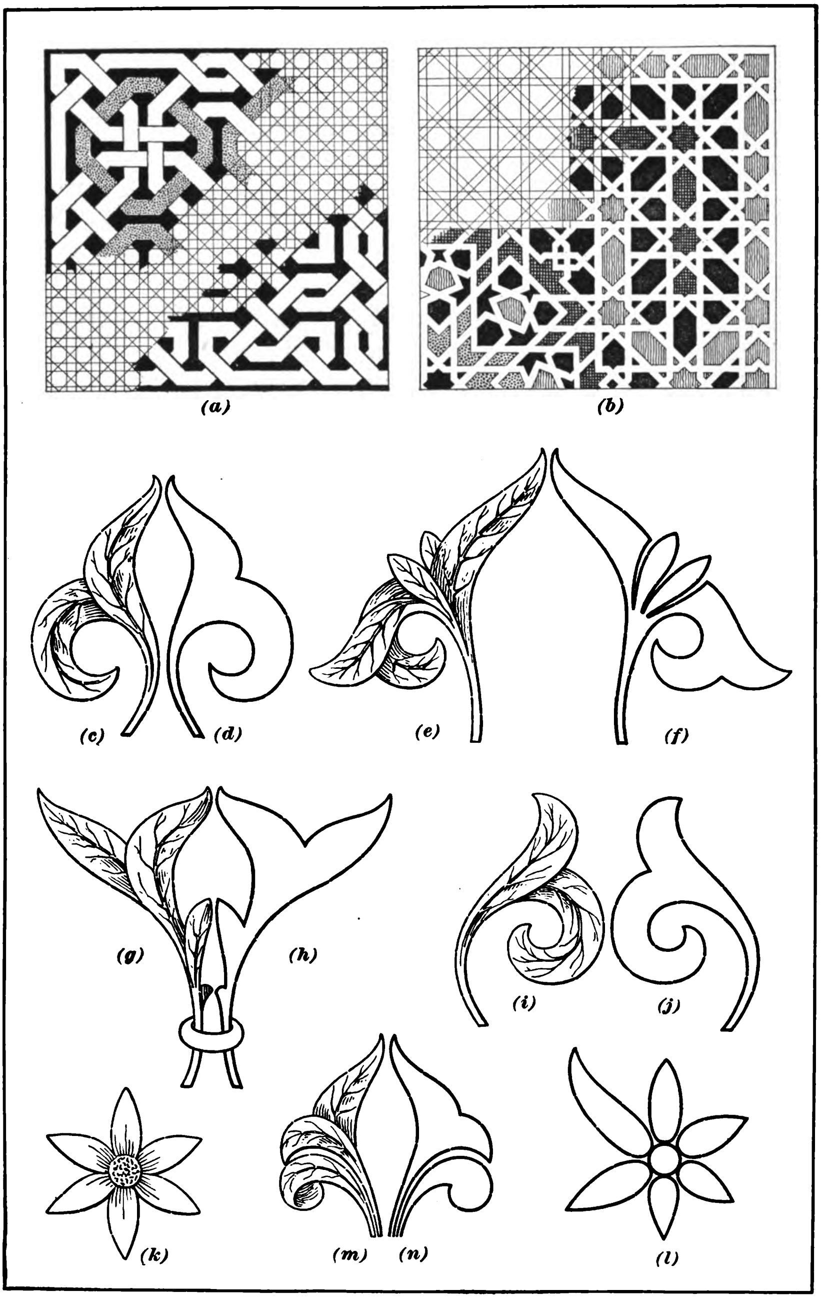

(a)
(b)
(c)
(d)
(e)
(f)
(g)
(h)
(i)
(j)
(k)
(m)
(n)
(l)

Fig. 37

of vertical and horizontal lines arranged in pairs, the distance between each pair being twice the distance between the lines composing each pair, and of diagonal lines drawn through the pattern at an angle of 45°, and spaced a distance apart equal to the vertical and horizontal pairs. The diagonal lines are arranged so that they will uniformly intersect the vertical and horizontal pairs.

In Fig. 37 (*b*) is shown a slight variation of the preceding interlaced pattern. In this example the vertical and horizontal lines are drawn in pairs and the diagonal lines are also drawn in pairs, but of slightly different proportion. The amount of Moorish ornament that can be developed from these two figures is unlimited, and the Moors themselves extended even this limit by the variety of coloring in the different parts.

Notwithstanding the fact that the Mohammedan was forbidden by the Koran to design anything that was based upon animal or vegetable types, there can be no doubt that some of the characteristic devices found in the Moorish wall decorations were conventionalized forms based upon leaves and flowers. In Fig. 37 (*d*), (*f*), (*h*), (*j*), (*n*), and (*l*) are six forms that constitute the details of Moorish surface decoration; and it can be readily believed that these conventional forms were derived from the plant forms shown in Fig. 37 (*c*), (*e*), (*g*), (*i*), (*k*), and (*m*).

30. Moorish Motifs Applied to Designs.—In Figs. 38 and 39 are shown typical examples of Moorish designs in color. The coloring of the Moorish decoration was treated as skilfully as was the form. The Moors followed certain fixed principles founded on observations of natural laws. The colors employed on their stucco work were in all cases a combination of the three primaries, red, yellow, and blue, the yellow being represented by gold; the secondary colors—purple, green, and orange—occurred only in the mosaic dados. These, being nearer the eye, formed a point of repose from the more brilliant coloring above. The system of Moorish coloring may be considered absolutely perfect. All the surfaces were modeled and proportioned according to the color they were to receive, and, using the colors red, blue, and gold, care was taken to place them in such positions that they should be best seen themselves and add most to the general effect. On molded surfaces, red (the strongest color of the three) was placed in the depths, where it might be softened by shadow, and never on a raised surface; blue was placed in the shade, but not deep shade; and gold was placed on all the surfaces exposed to strong light, for it was evident that by this arrangement alone could their true value be obtained. The several colors are either separated by white bands or by the shadow caused by the relief of the decoration itself, and this seems to be an absolute principle required in coloring—colors should never be allowed to impinge on one another. These facts about Moorish designs and coloring are well illustrated in Figs. 38 and 39, whose coloring may be considered authentic and reliable.

31. Modern Applications of Moorish Designs.—The Moorish style, particularly the geometrical interlacing and strapwork motifs, is widely used in modern decorative work. In the interior decoration of theaters it is used freely, as well as in the decorating, both interior and exterior, of Masonic buildings and lodge rooms, and buildings used for amusement purposes at expositions, fairs, pleasure resorts, etc. In Fig. 40 is shown a modern interior in which the Moorish treatment has been used. If this illustration is studied with care, there will be revealed the manner in which historic motifs are adapted to modern use, particularly in the case of Moorish decoration.

In the case of the side-wall and ceiling decorations, usually of stamped metal or tile, in restaurants, stores, and other public places, the interlacing strapwork Moorish decoration is well known. These forms of modern use of the Moorish style are so well known as to make it unnecessary to illustrate them.

In Fig. 41 is shown how Moorish design is used on an electric light fixture. Not only is the structural shape of the fixture Moorish in construction, but the surface decoration, executed in enamels, is likewise strictly correct in style to conform to Moorish forms and coloring. This example of Moorish coloring is particularly worthy of close study.

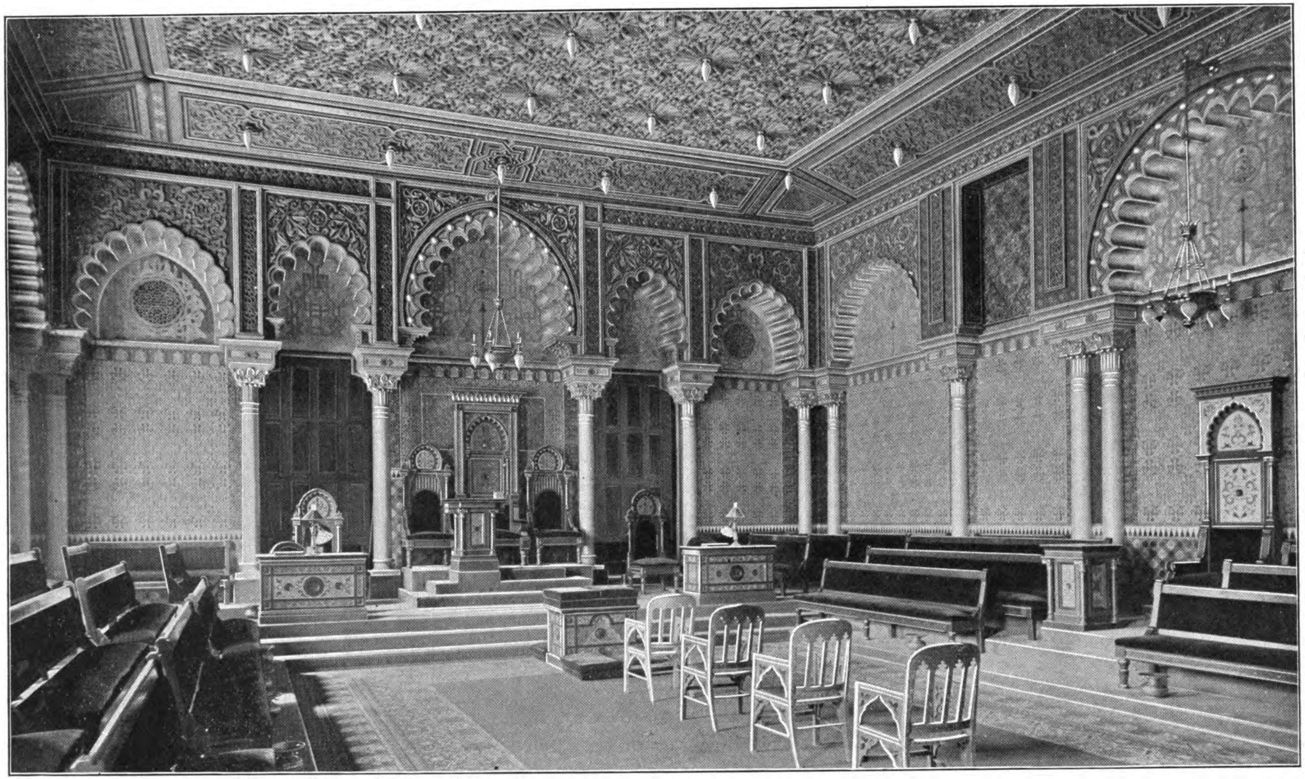


Fig. 49

ARABIAN

32. Source of Arabian Motifs.—The Arabian style is an outgrowth of the Byzantine, influenced by an oriental feeling and by Mohammedanism. In the Arabian style there is met the restriction, as in the case of the Moorish, that the use of any animal or vegetable forms as an element of design is strictly forbidden by the Koran of the Mohammedan religion. In the Arabian style there is therefore a system of constructive decoration, the complicated framing of which was fascinating to the geometrically inclined mind of the Arabian designer.

The lower two rectangles, (*d*) and (*e*), of Fig. 42 are typical forms of the Arabian style.

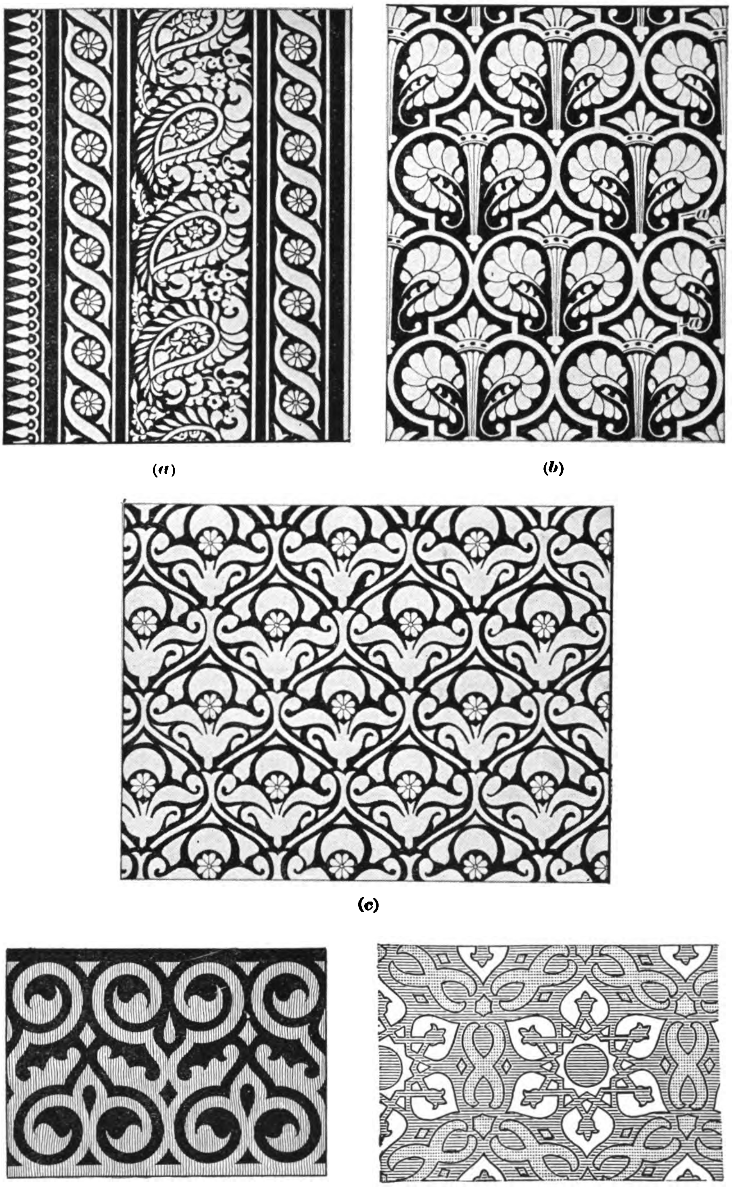
TURKISH

33. Source of Turkish Motifs.—Another division of the group of styles of design of the Mohammedan class is the Turkish style. The Turkish embroideries give about the only style of design work that can be considered strictly national, as work of this character must necessarily exhibit the characteristics of the race; and, judging from this, it will be readily seen that their art instinct is far inferior to that of India. Indian embroidery is perfect in the distribution of its forms and in all its principles of decorative design work. In the Turkish style, the only examples that approach any degree of perfection are found in the carpets, but these are executed mostly in Asia Minor, and are probably not designed by Turks. The designs of most of them appear more like the Arabian style, and differ from the Persian carpets in being more conventional in their foliage treatment.

The most prominent colors in the Turkish style are green and black; in fact, these colors form a feature of this style. In modern Turkish work, green is much more prominent than in ancient examples, where blue was the important color.

The general principles of the distribution of form are the same in the Turkish and the Arabian styles, but there is a difference in the treatment. In both the Arabian and Moresque

ARABIAN, INDIAN AND PERSIAN DECORATION



(a) (b) (c) (d) (e)

Fig. 42

styles, the surface is only slightly rounded and the enrichment is secured by sinking in the lines; or, where the surface was left smooth, additional pattern upon pattern was obtained by painting. The Turkish style, on the contrary, presents a curved surface, and the effect is not as broad as that produced by the sunken-feather treatment of the Arabian and Moresque. Another peculiarity that readily distinguishes the Turkish from the Arabian is its abuse of the reentering curve, thus causing all its detail to have a feeling of instability and unrest. This is also, to a certain extent, characteristic of the Persian style. In the Moorish style, however, it appears only exceptionally

It is not practicable to give specimens of the Turkish style, but an inspection of the striped and all-over patterns shown in Fig. 42 will enable one to get an approximately correct idea of it.

INDIAN

34. Source of Indian Motifs.—The term *Indian* in this connection refers to the decorative work of the people of India, and has no connection with the work of the North American Indians in the western and southwestern parts of the United States.

A typical example of the Indian style is shown in (*c*) of Fig. 42, which is an all-over pattern taken from an Indian textile fabric. This example exhibits the regularity of repeated form that completely fills the surface. There is a slight tendency toward a geometrical formation observable in this pattern, where the wavy line becomes tangent to its neighbor. This geometrical pattern, however, is not so rigidly carried out as in Fig. 42 (*b*), where the construction lines governing the main details consist merely of semicircles connected by short, straight lines, thereby forming knees, as indicated. The style enclosed in the geometrical figures thus formed is typical of Indian design, and shows a number of forms tangent to a general stem, all of which may have had their origin in brush strokes of painted work, or possibly in the shape of the palm leaf, which they slightly resemble.

In Fig. 42 (*a*) is shown a typical example of an Indian design taken from a woolen fabric, many of the details of which will be found similar to the strokes just referred to.

35. Characteristics of Indian Style.—The most striking characteristics of the Indian style are continuity and abundance of decoration. The surface decoration is usually filled up entirely with a profusion of forms that, if not exactly alike, are very similar. The ground color is always warm and harmonious—occasionally light, though more frequently dark—which serves to unite the designs and to add greatly to the general effect.

The method of distribution and the admirable feeling for color procures in Indian decoration a richness and calm that gives it an undefinable sense of repose. The designs are usually based on some floral type and are treated in a most conventional manner, and though the imitation bears a closer resemblance to nature than in most of the styles already studied, it is by no means servile. The type from which the design motifs are derived can usually be recognized without trouble, and, although floral motifs are occasionally seen under the pure art form characteristic of the Egyptian style, they are usually treated with a pliancy of execution and picturesqueness of idea that bring them to a closer resemblance to the modern style.

In the execution, however, Indian art never attempts the rounding or modeling of a form (a process that is naturally opposed to the idea of surface decoration), and usually confines itself to silhouette drawings, in which the outline is shown off by a dark tint on light grounds or by a light tint on dark grounds.

In the equal distribution of surface patterns over the grounds, the designers of India exhibit a remarkable perfection of drawing. An exact balance is obtained between the various colors used, and this balance is carried to such a nicety that it is practically impossible to reproduce any of their woven or embroidered goods with any degree of accuracy. In all their woven fabrics, the colors are so fused together that the entire piece of goods at a little distance presents no individual coloring, but a neutralized bloom.

PERSIAN

36. Source of Persian Motifs.—The outlines of Persian designs are generally taken from the conceptions of the Arabian style, but they are modified by Indian tradition and the peculiar genius of the Persian race. The floral motif in some examples is scattered through the decoration with apparent freedom, and in others it is inserted in the linked network and usually placed at the intersection of lines; but even in the latter case, it is treated in a manner that is half way between the Arabian conventionalism and the Indian naturalism. A consideration of the characteristics of the Persians will help to understand this more fully.

The Arabs were Mohammedans, while the Persians had split from this faith. The Persians attributed to flowers a symbolical language, and did not exclude the representation of flowers in their decoration, which is also animated by real and fantastic animals, and sometimes, though rarely, with the human figure. The resources resulting from this mixed style are enhanced by the manual skill and remarkable fertility of invention possessed by the Persians. Bookbinders, potters, embroiderers, and miniature painters emulate one another in taste and skill. Persian carpets are still considered the finest in the world, and the vases, tiles, and enamel bricks from that country are models of taste, and European manufacturers endeavor to equal them by imitation.

37. The Indian and Persian styles resemble each other in their polychromatic decoration. The characteristic is usually a silhouette, with geometrical outlines relieved by conventional coloring on a dominating generating ground.

The great attention given, in Persia, to the illumination of manuscripts, which are widely spread through all Mohammedan countries, would naturally tend to spread the influence of this mixed style, and the decorations of houses at Cairo and Damascus, and the mosques and fountains, even of Constantinople, are tainted with it to a greater or less extent. Groups of natural flowers are represented in vases and enclosed in panels of conventional Arabian designs.

It will be observed that all the classes or styles of Saracenic or Mohammedan designs that have been discussed, the Moorish, Arabian, Turkish, Indian, and Persian, have points of similarity, and while it is not practicable to give here illustrated examples of the Persian style, an idea may be obtained of it by reference to the examples of the Indian style in Fig. 42 (*a*) and (*b*).

CELTIC

38. **Source of Celtic Motifs.**—The Celts undoubtedly had a spontaneous national art, though its birthplace, whether in Scandinavia or Ireland, has never been satisfactorily decided.

Interlacing straps or bands form almost the only element of the Celtic designs of the earlier period, and this establishes its antiquity, for the characteristic of intertwining details is essentially a primitive style. Its distinctive mark is the division of the surface, decorated by such a combination of lines that the development is usually happy, possible, and logical, and there is no doubt that the origin of these designs was procured originally from interlaced cords. The pliability of this original type would account for the curved instead of acute angles, this being a characteristic difference between the Celtic and Arabian geometrical designs.

The variety of productions obtainable from such simple elements is remarkable. In many of them the complications prove, by their skilful divisions and the ingenuity of the windings, a practical comprehension of decorative construction. There is lacking, however, in this style a vital element—the element of more extensive representation—and its resources were threatened with exhaustion from having used every possible combination of the intertwinings of a cord.

39. **Characteristics of the Celtic Style.**—The chief characteristics of the early Celtic style consist: *first,* of the entire absence of foliage or other vegetable ornament; *second,* the extreme intricacy and excessive minuteness and elaboration of the various patterns, most of which are

geometrical, consisting of interlaced ribbon work, diagonal or spiral lines, each of which invariably weaves itself alternately above and below each successive transverse strand, and strange, monstrous animals, and birds with long topknots and tongues and tails intertwining in almost endless knots. Some of the manuscripts have entire pages covered with elaborate patterns in compartments, the whole forming a beautiful cruciform design, and one of these facing a commencement of each of the four gospels.

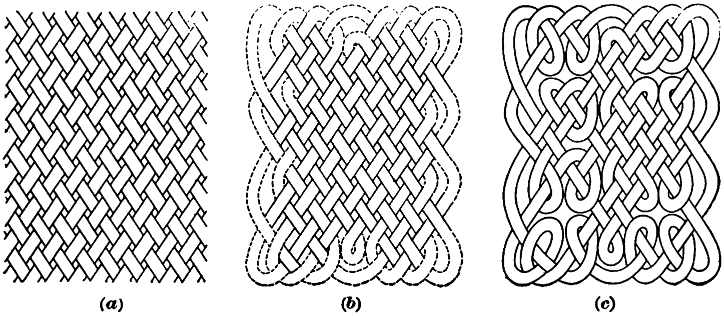

(*a*) (*b*) (*c*)

Fig. 43

The labor employed in such a mass of work must have been immense, the care most infinite, as a critical examination with a magnifying glass does not detect an error in the truth of the lines or the regularity of the interlacings; yet with all this minuteness, the most harmonious effect of coloring has been produced.

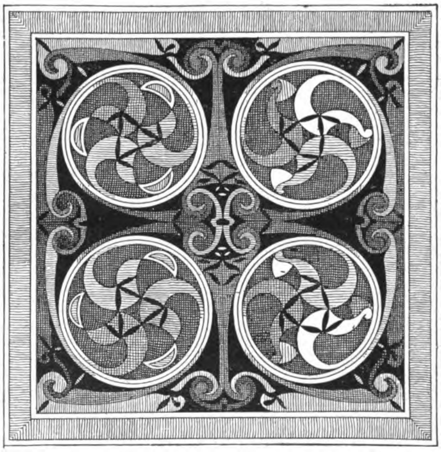


Fig. 44

Of the curious intricacy of some of these designs an idea may be obtained by following a ribbon in one of these patterns.

The method adopted to secure this intricate interlacing, so that each strap shall alternately cross above and below each following one, can be better understood by reference to Fig. 43, where the preliminary arrangement of a woven pattern is laid out in (*a*) and the turning and joining of its exterior ends are shown by the dotted lines in (*b*), while at (*c*) is seen the completed interlacement and complication of interior curves and returnings.

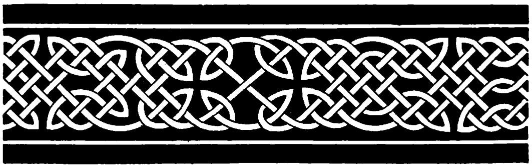


FIG. 45

Figs. 44, 45, and 46 show typical examples of Celtic designs.

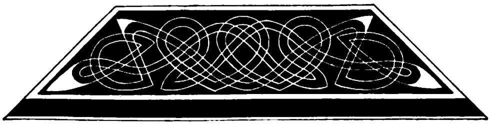


FIG. 46

Sometimes two ribbons run parallel to each other, but are interlaced alternately, as in Fig. 45. When allowable, the ribbon is dilated and angulated to fill up particular places in the design, as in Fig. 46.

GOTHIC

40. The Periods of Gothic Decorative Art.—The term *Gothic* as generally accepted and applied to this style is a misnomer. The Goths, from whom came the word Gothic, were a rude, warlike people, with no tendency toward the refinement that could produce such beautiful and stately decorative work as that known as the Gothic. A better term for this style would be the *Christian* style, which might be said to have had its beginning in the early Christian era, its middle in the Romanesque and Byzantine eras, and its culmination and glory in the Gothic era. The best types of Gothic are the English

Gothic and the French Gothic, their decorative work being more realistic and original, and more logical in construction, than the German, Spanish, and Italian Gothic.

The student who desires to study the Gothic style more fully, and to go into it from the standpoint of Gothic architecture, is advised to consult, in libraries, reference books on Gothic architecture. Architectural considerations, however, need not enter in this present treatise.

41. English Gothic.—English Gothic is considered the best of all forms of Gothic decoration, and is subdivided into three periods: Early Gothic, Decorated Gothic, and Perpendicular Gothic.

The **Early Gothic** is probably the best of the three English periods, and as a rule is most appropriately designed. The leafwork is characterized by spiral lines and prominent stems, as in the Romanesque, and it usually fills the space well with main lines appropriate to the form decorated. The motifs are well conventionalized, and the starting points of growth are usually cleverly placed.

The **Decorated Gothic** is less conventional, and not always so appropriate in its application. The characteristic lines of the decoration of this period are undulating, or wavelike.

The **Perpendicular Gothic** is still more realistic, giving evidences of a decline; and the leaf forms are more rectangular than in the Decorated Gothic.

42. French Gothic.—The French Gothic was divided into three classes: Early Gothic, Rayonnant Gothic, and Flamboyant Gothic; and the decoration of these periods possesses characteristics similar to those of the contemporary English periods. **Rayonnant** means radiating, and refers to the radiating character of the decoration, tracery, etc., of this period. **Flamboyant** means flaming, and refers to the characteristic outspreading of the tracery, leaf forms, etc., of this period, which precedes the Renaissance.

Characteristic motifs of the style of the French Gothic periods include the quatrefoil, the trefoil, and the cinquefoil, the leaf forms, especially in the early periods, possessing a certain

GOTHIC DECORATION

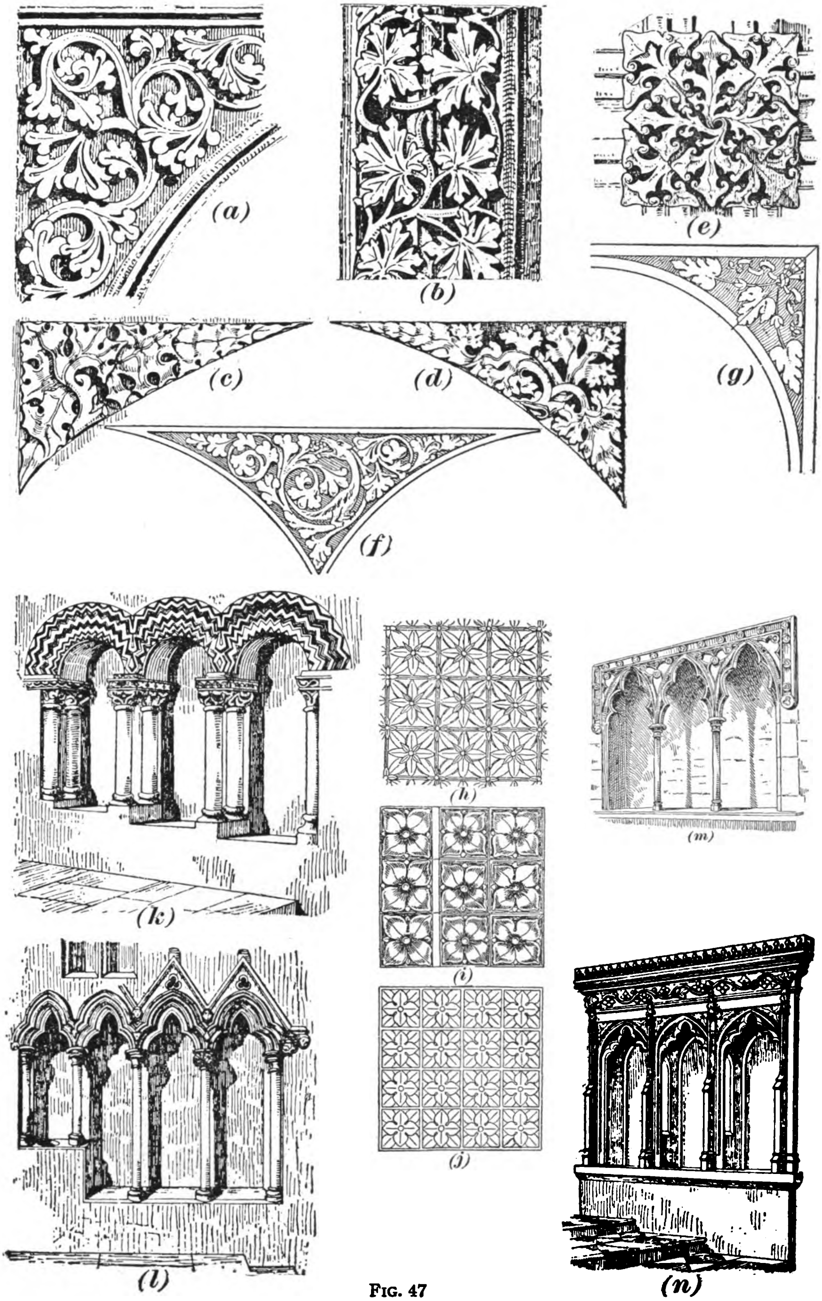

(a)
(b)
(e)
(c)
(d)
(g)
(f)
(k)
(h)
(m)
(i)
(j)
(l)
(n)

Fig. 47

convexity of shape not found in any other style. Moldings were deep cut, and the bird's beak and the reed are much in evidence. The moldings were also ornamented with the dogtooth, leaved flower bosses, ball flowers, cornice flowers, grape vines, crockets, etc.

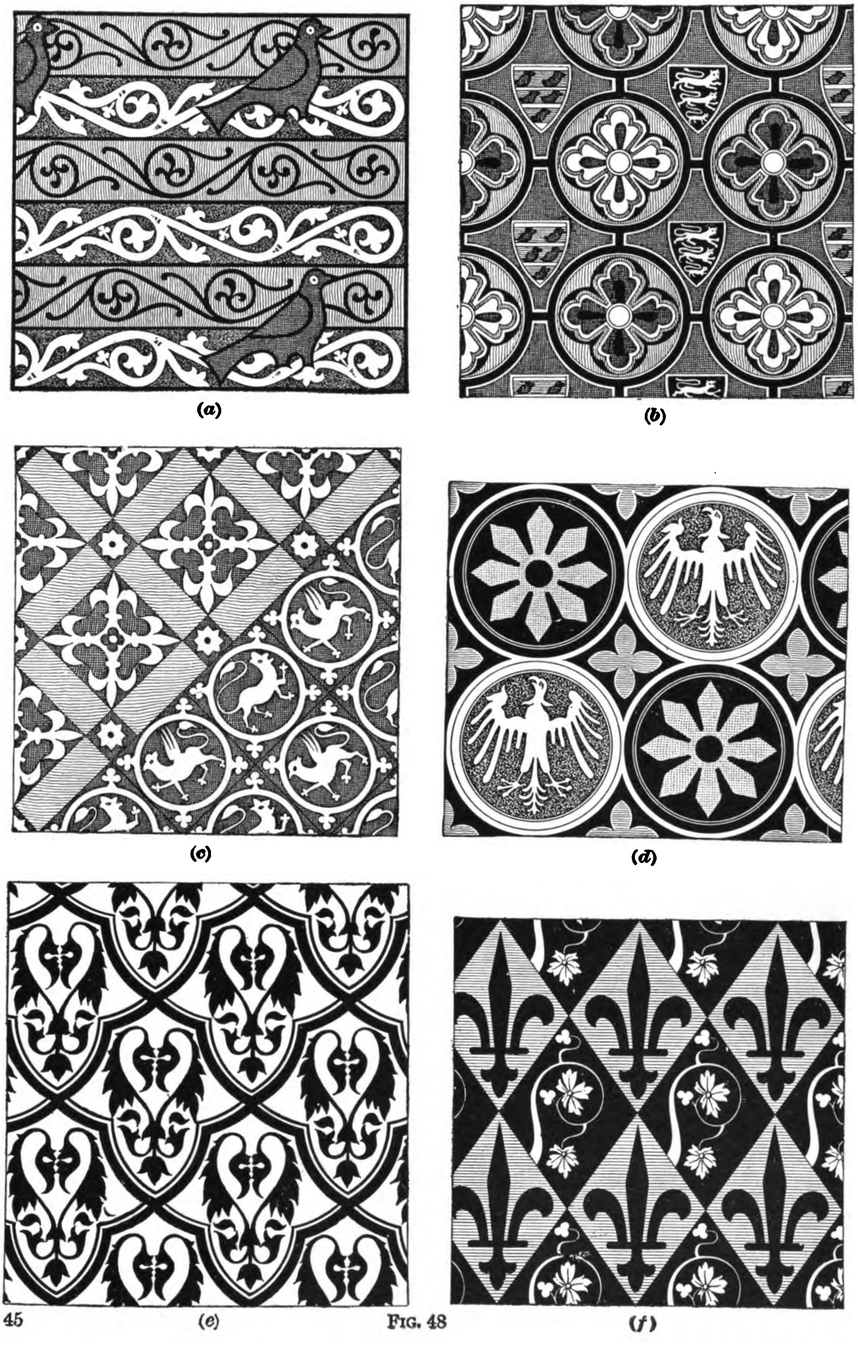
43. Typical Examples of English and French Gothic Designs.—In Fig. 47 are shown not only architectural forms of the English and French Gothic styles, but particularly running and all-over patterns of these styles. Wall surfaces were subdivided and decorated with various forms of all-over patterns, as shown in Fig. 47 (*a*) to (*f*). Running decoration consisting of carved forms was used to subdivide the panels. The characteristics varied with each style, but the foliated forms used were the same as those applied to other details in each individual period. The forms of grouping and decorations shown in Fig. 47 (*k*), (*l*), (*m*), and (*n*) are characteristic of the several periods.

Simple bands of characteristic running designs were used, in which conventional bird forms were introduced, as shown in Fig. 48 (*a*), as was also a treatment of circles and heraldic shields, as in (*b*). A combined circle and checker pattern, as in (*c*), was also used with animal forms introduced in the circles. Elaborate color schemes were sometimes used on the moldings and as a background to the foliage of the capitals.

The wall diapers were usually very simple, but were brilliant in red, blue, green, and gold (see Fig. 49). The details seem to have been stenciled, or partly stenciled, and partly worked up freehand.

It would be of no particular advantage to introduce here a discussion of German, Italian, Spanish, and Dutch Gothic, or to show specific examples of each style, as this would only tend to confuse the young designer. The specimens that have been shown are ample to give a knowledge as to what are strictly Gothic decorative forms. Further, the average commercial designer rarely has occasion to work in these periods of the Gothic style, and for this reason descriptions and illustrations of the decoration of these periods would be superfluous.

GOTHIC DECORATION



(*a*)

(*b*)

(*c*)

(*d*)

(*e*)

FIG. 48

(*f*)

MODERN APPLICATIONS OF GOTHIC STYLES

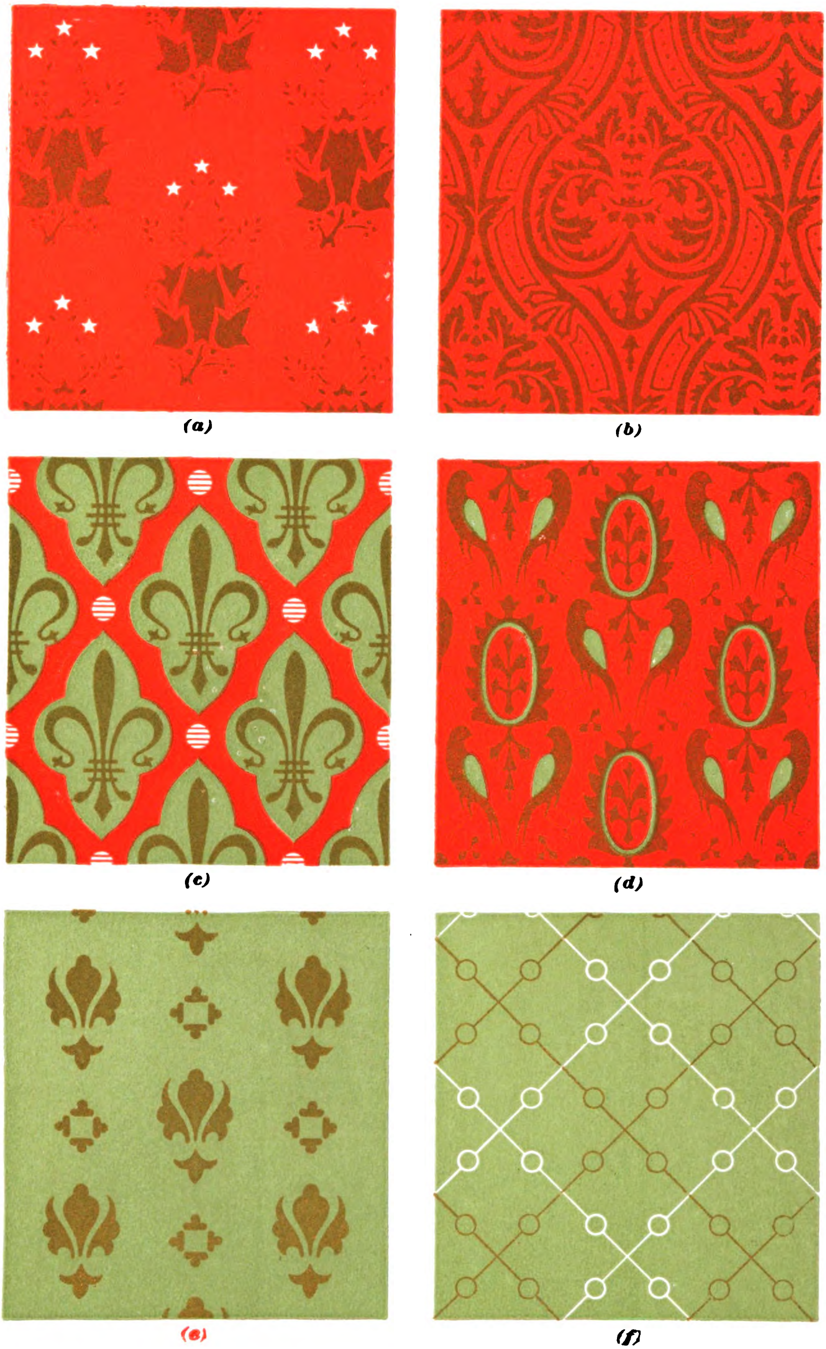
44. Ecclesiastical Decorations.—In modern decorative work the widest avenue for the use of the Gothic style is in ecclesiastical decorations. Not only is the decorative stonework of the churches—the window tracery and mullions, and the carved exterior and interior stonework—designed and executed in the pure Gothic style (usually English Gothic), but the furniture and fittings of the church interiors are also in Gothic. All this class of work needs the services of the designer skilled in handling Gothic motifs.

The system of decorating the walls is exactly the same as used in historic Gothic examples; that is, to subdivide the blank spaces into small squares or diamonds and then to fill these with spot forms. Such historic patterns as used in Figs. 48 and 49 are employed in modern work just as illustrated. Usually at the tops of walls so decorated there are placed either horizontal borders or friezes, or friezes with Gothic canopies. Rich colors, dull reds and golds, give a warm dignified effect to the scheme. In Fig. 50 is shown the decorative plan of covering the walls with Gothic all-over patterns, and although not a modern interior, it illustrates the style of wall decoration.

The designer has particular scope, however for his art when designing the mural decorations and the stained and leaded glass for the windows. The decorative work in stained and leaded glass work conforms to historic examples almost literally. There is a tendency in modern window design to fill the top of the window opening with canopy work or imitation tracery designed in conformity with the stone and wood tracery and mullions of the window itself, the borders and fields being filled with historic examples, as in the case of modern Gothic wall decorations. In Fig. 51 is illustrated in colors a stained-glass window design in the Gothic style, showing a typical modern application of the Gothic.

45. Other Modern Gothic Designs.—The modern application of the Gothic style, however, is not confined to ecclesiastical work. Other buildings are designed in Gothic, such

GOTHIC DECORATION



(a) (b) (c) (d) (e) (f)

Fig. 49

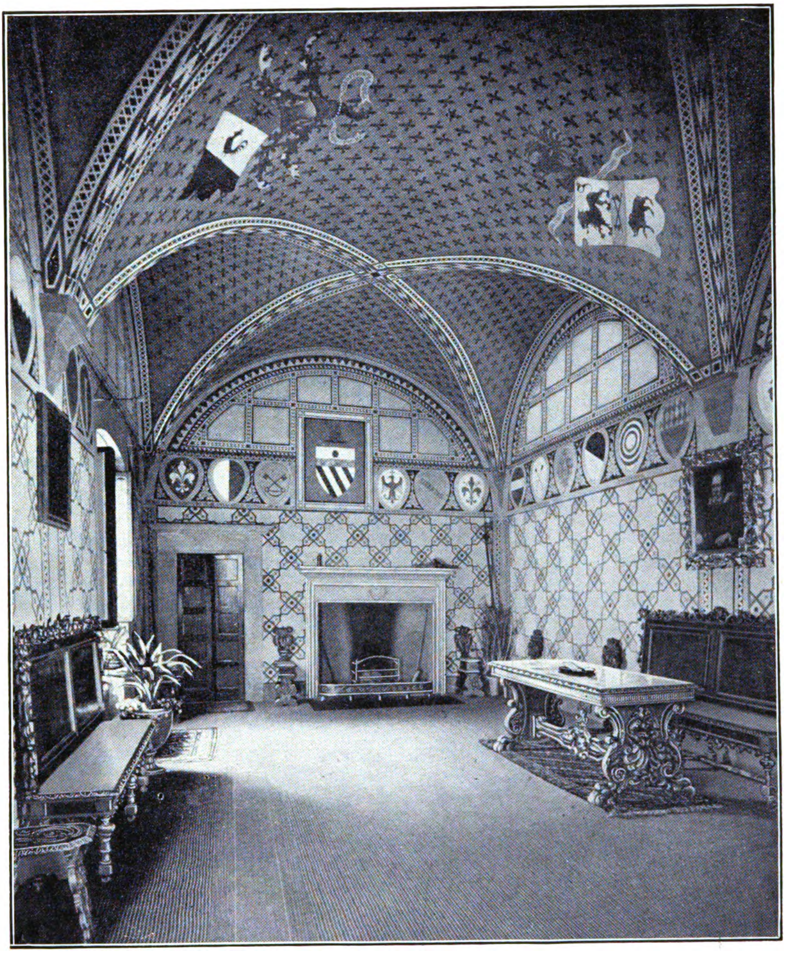


Fig. 50

as banks, office buildings, and even apartment houses. The interior decorations and fittings, of course, conform to the Gothic style. In Fig. 52 is shown an electric-light bracket of Gothic design. The long lines of the main standard, the trefoil arrangement in the bracket itself, and the deeply serrated leaf forms, all stamp it as pure Gothic in design.

RENAISSANCE

46. Classification of Renaissance Decorative Art. The word "Renaissance" literally means "new birth," and its appropriateness to the style of decoration now being considered will be evident. This style probably owed its inception to the revival of classic literature in Italy, which was fostered and spread by the invention of printing. From Italy, this movement spread to France, Germany, and all of Western Europe that formerly was included in the Roman Empire. There are, therefore, usually considered five classes of Renaissance design work, as follows: **Italian, French, Spanish, German,** and **English Renaissance.**

This revival of the classic shows the greatest purity in Italy, where the Gothic had never entirely replaced it. For this reason the classic lacks a certain charm, which the French Renaissance possesses in a marked degree, and which is due to the infusion of a certain amount of Gothic influence. In England, the Gothic feeling was more tenacious, and is never entirely missing from the Renaissance work.

The German Renaissance partakes of the general characteristics of the French, but is much less refined. It also has some of the characteristics of the late English Renaissance. The Spanish Renaissance shows both Gothic and Moorish influence, and in the early work is very beautiful.

If the student should encounter, while reading the descriptions of the Renaissance examples in Figs. 53 to 68 inclusive, any terms, the meaning of which he does not know, these terms and their meanings should be looked up in a good unabridged dictionary. This is a duty that the student owes to himself in order to get the most out of his studies.

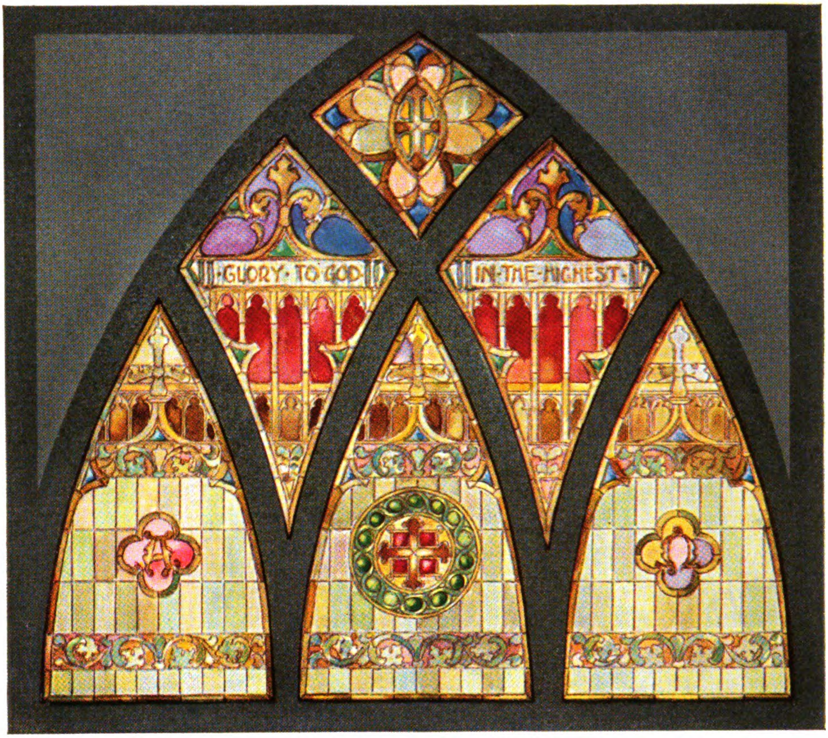

GLORY·TO GOD
IN·THE·HIGHEST

FIG. 51

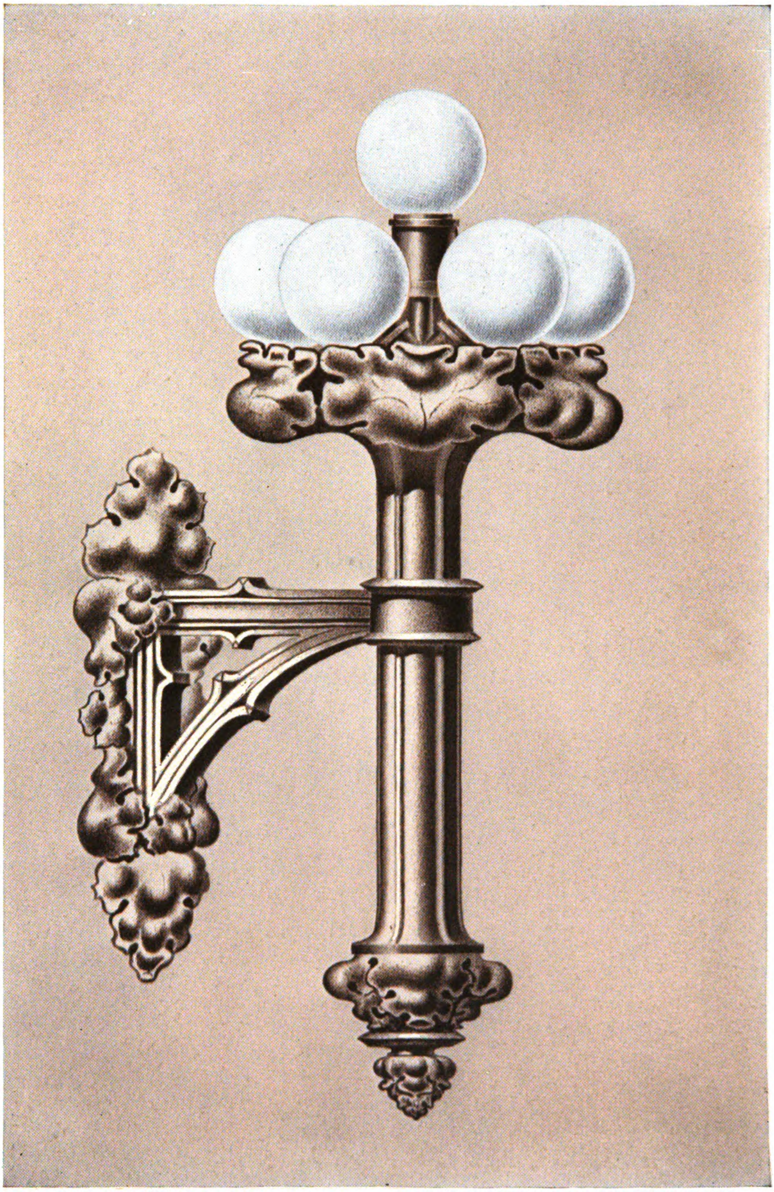


Fig. 52

ITALIAN RENAISSANCE

47. Sources.—The source of the Renaissance movement throughout Europe was the revival of learning and classic art in Italy. The writings of, Dante, Petrarch, and Boccaccio had much to do with the new interest in literature, which was greatly assisted by the invention of printing.

The motifs employed were those of the Roman and Greek with a reminiscence here and there of the Romanesque or Byzantine. They include the acanthus, the encarpus, nymphs, cupids, griffins, masks, vases, ribbons, spirals, etc. The Italian Renaissance is an exuberant style, full of vivacity and sentiment, and displays a wonderful inventive and creative faculty, backed by great enthusiasm and strength.

48. Examples.—In Fig. 53 is shown a page of miscellaneous designs typical of the Italian Renaissance style, which will serve as valuable reference material.

In Figs. 54 and 55 are shown typical examples of the Italian Renaissance styles somewhat more in detail.

The arabesques that were carved in panels on the shafts of the pilasters, instead of the flutings of the classic models, were intricate and symmetrical, and were usually duplicated on opposite sides of a center line, as shown in Fig. 54. Fluted shafts were also used and the flutings were sometimes filled one-third the way up from the base with carved reeds or rope-like forms.

Bosses, as shown in Fig. 55 (*a*), (*b*), and (*c*), were introduced into ceiling decoration, and elaborate iron grilles, as shown in (*d*) and (*e*), were placed in the semicircular door heads.

The use of color in the decorations of the Italian Rennaissance was lavish and the designs were most elaborate and excellent in execution. It was an age when the finest painters and sculptors of the day were employed on the decorations. The subjects adopted were allegorical or religious, and were treated with conventional symmetry, while the rendering, at times, was decidedly naturalistic. In Fig. 56 (*a*) is shown a panel from one of the pilasters in the Vatican. It is symmetrically

ITALIAN RENAISSANCE DECORATION

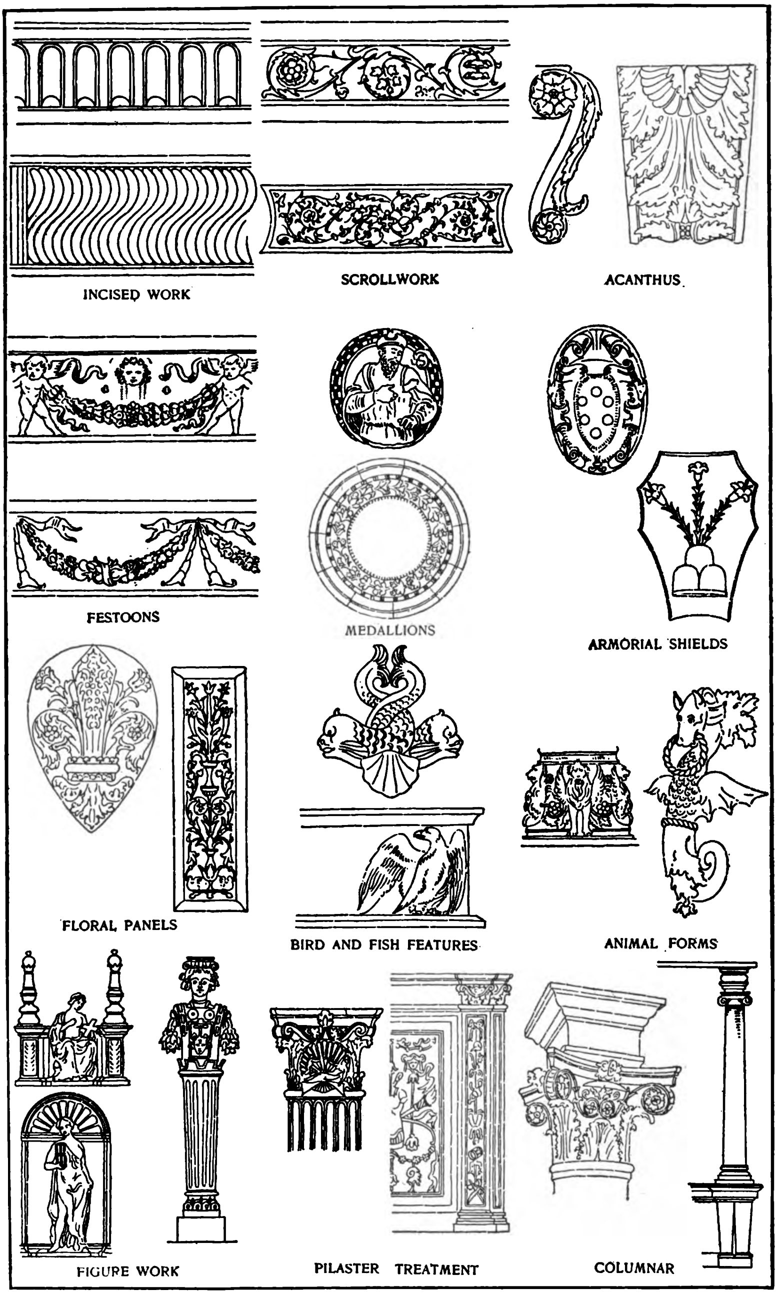
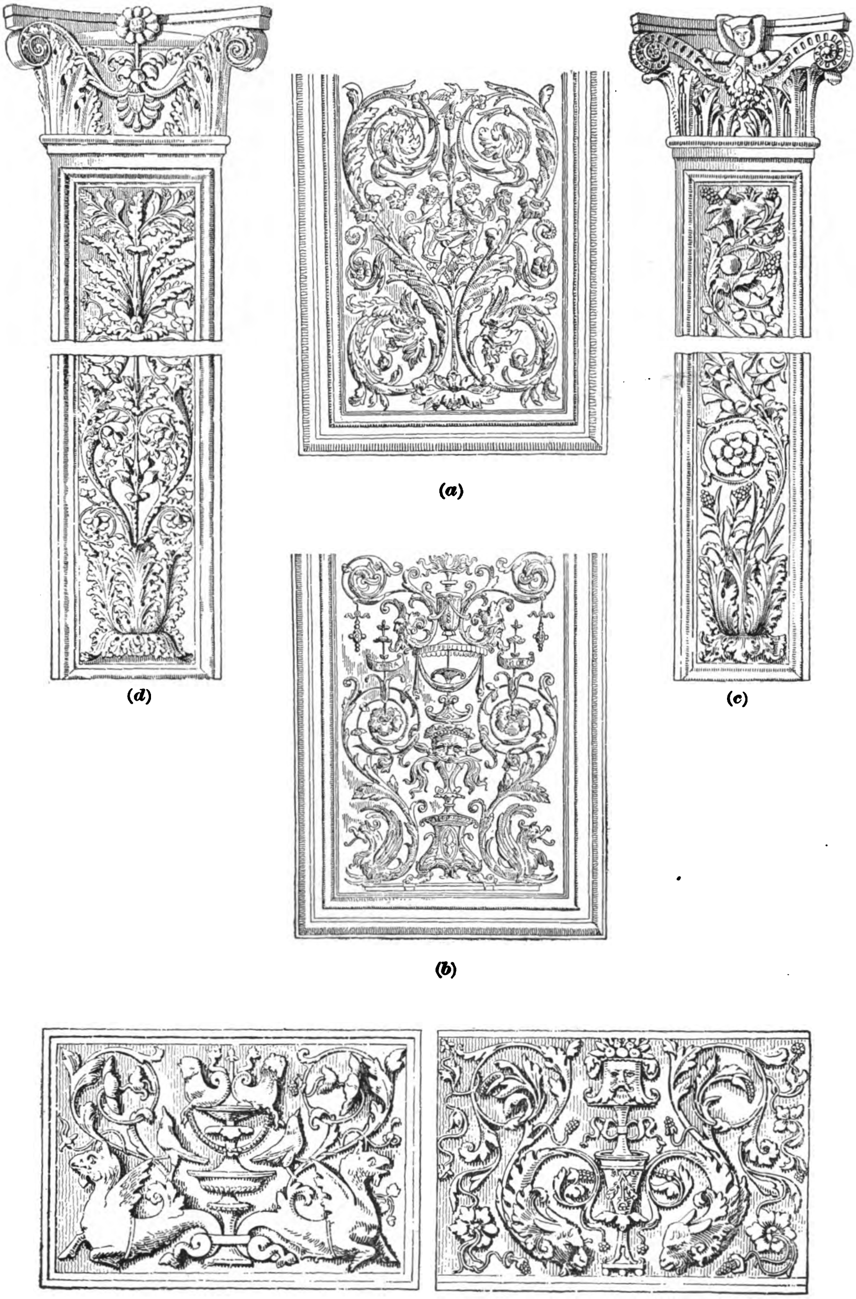

INCISED WORK
SCROLLWORK
ACANTHUS
FESTOONS
MEDALLIONS
ARMORIAL SHIELDS
FLORAL PANELS
BIRD AND FISH FEATURES
ANIMAL FORMS
FIGURE WORK
PILASTER TREATMENT
COLUMNAR

FIG. 53

ITALIAN RENAISSANCE DECORATION


(a)

(b)

(c)

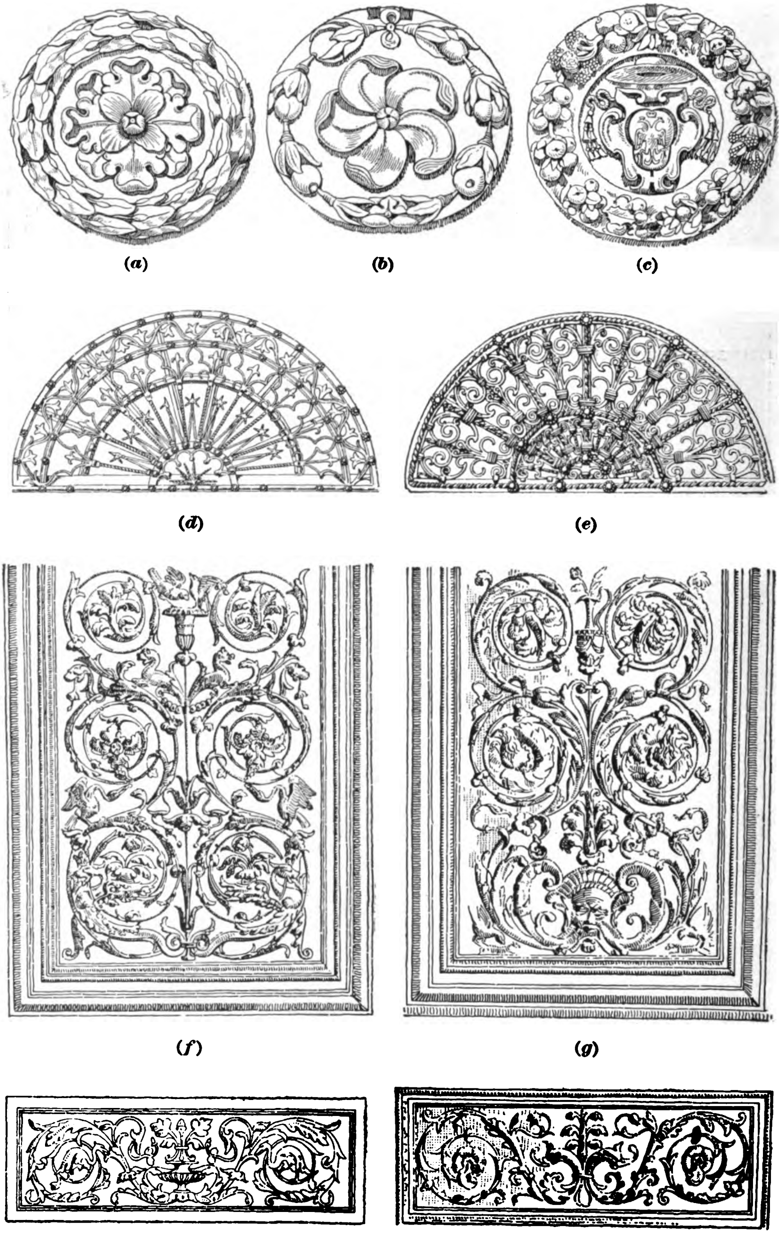
(d)

(e)

(f)

FIG. 54

ITALIAN RENAISSANCE DECORATION



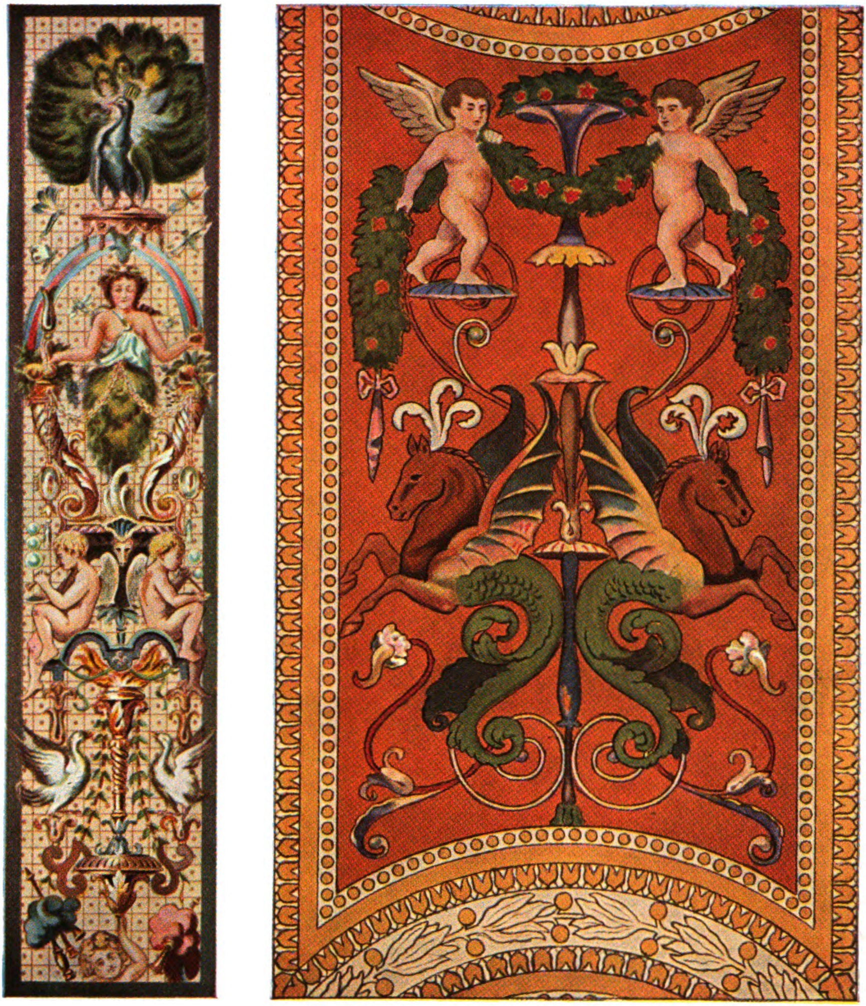
(a) (b) (c)

(d) (e)

(f) (g)

(h) FIG. 55 (i)

ITALIAN RENAISSANCE DECORATION

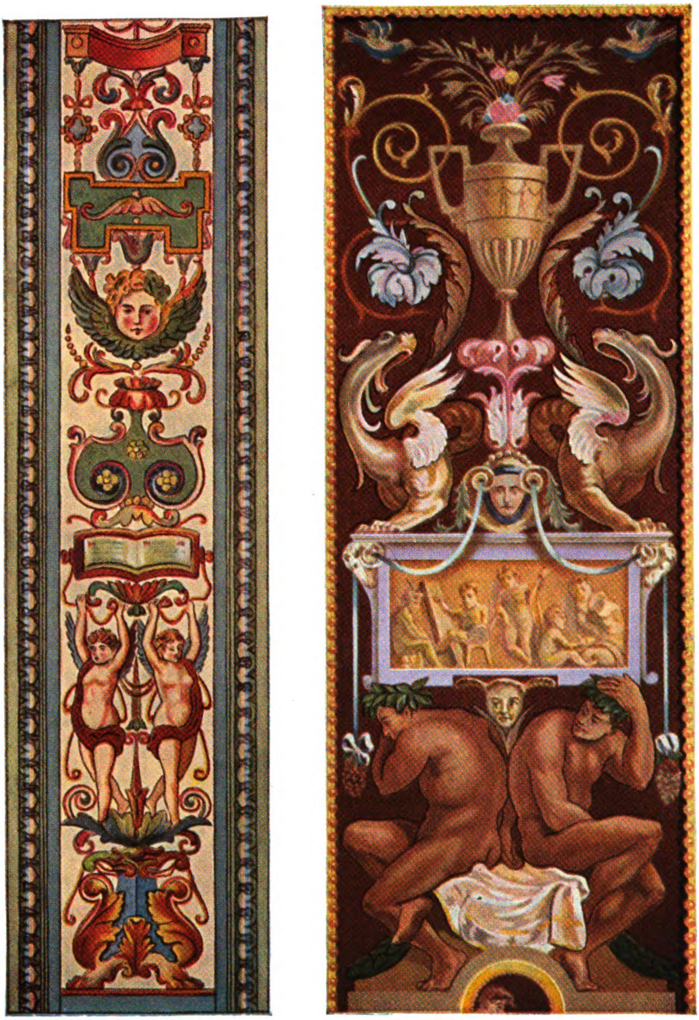


(c)

(a)

FIG. 56

ITALIAN RENAISSANCE DECORATION



(*d*) (*b*)

Fig. 57

disposed on each side of a vertical center line and made up of subjects borrowed from mythological conceptions, combined in a conventional treatment similar to the Pompeian paintings. The central stem consists of an attenuated vase from which tendril-like scrolls branch, while impossible grotesque animals rear themselves on each side. These suggest ideas borrowed from the mythology of the Greeks, as do also the naturally rendered and conventionally posed cupids above.

The forms are shaded to give "roundness" to the parts, a treatment antagonistic to the highest ideals of surface decoration, but this treatment is found in many Renaissance decorations and is characteristic of the style.

In Fig. 57 (*b*) is shown another panel where two male figures, naturalistically rendered, support a tablet and superimposed decorative forms. Analyzing the design, one finds the male figures suggestive of Hercules or Atlas, the tablet appears to be modeled after a Roman altar, and the griffins, acanthus scrolls, and Greek vase all appear to be of Pompeian origin. An unlimited variety of design can thus be invented and when carried out in the varied possibilities of color scheme, the painted decoration of the Renaissance presents a unique and interesting study.

49. Importance of Designs of This Period.—To the designer, the study of this period is of the greatest value, as in no style have the motifs ever been better spaced or arranged to contrast more agreeably with the direction of the adjacent structural lines by which they were bound and always kept in subordination. Rarely do we find a detail placed in a horizontal position that is more suitable to a vertical one, or vice versa; and rarely are the proportions of the details and moldings, or the stiles and rails by which regularity and symmetry are given to the whole, at variance with one another.

FRENCH RENAISSANCE

50. Classification of French Renaissance Style.—The French Renaissance style, which is considered the most clever and original of the Renaissance styles, cannot be properly described in a few words. The examples usually illustrated are taken from the work executed for the different kings by foreign and native artists, but a vast amount of very superior work was also done by craftsmen outside of the court influence, which, however, does not bear the distinctive marks of the different courts; see Fig. 58. For this reason, it is difficult to locate this style chronologically without an intimate knowledge of French art and literature.

The work done under the influence of the various courts may be separated into periods, which include the reigns of several rulers, as follows:

Period	Name of Ruler	Duration of Reign
Early Renaissance, or Valois	Louis XI	1461–1483
	Charles VIII	1483–1498
	Louis XII	1498–1515
	Francis I	1515–1547
	Henry II	1547–1559
	Francis II	1559–1560
	Charles IX	1560–1574
	Henry III	1574–1589
Bourbon	Henry IV	1589–1610
	Louis XIII	1610–1643
	Louis XIV	1643–1715
Rococo	Louis XV	1715–1774
	Louis XVI	1774–1793
Empire	Napoleon I	1804–1814

51. Valois Period.—The work under the early Renaissance, or Valois, period is probably best illustrated by the work done during the reigns of Francis I and Henry II; see Fig. 59. Characteristic of the style under Francis I are paneled pilasters intersected by diamond or rosette patterns, carved tracery, the salamander (the symbol of Francis I), cherubs, heads, the human figure, satyrs, griffins, **S** consoles, medallions, cartouches, the rope (symbol of Anne of Brittany, wife of Louis XII), the conventionalized ermine symbol, etc.

The work under Henry II, son of Francis I, probably reached the highest plane of the French Renaissance. The decorative

FRENCH RENAISSANCE (VALOIS) DECORATION

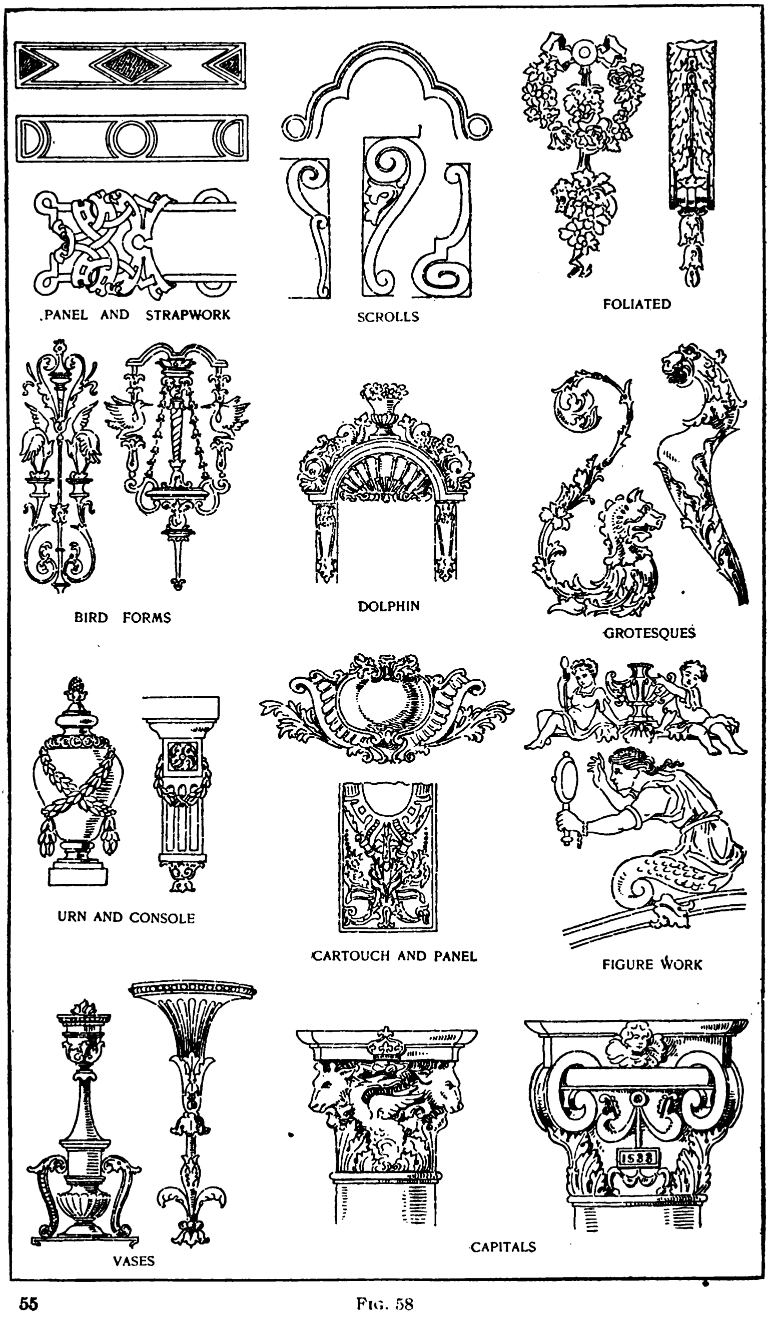
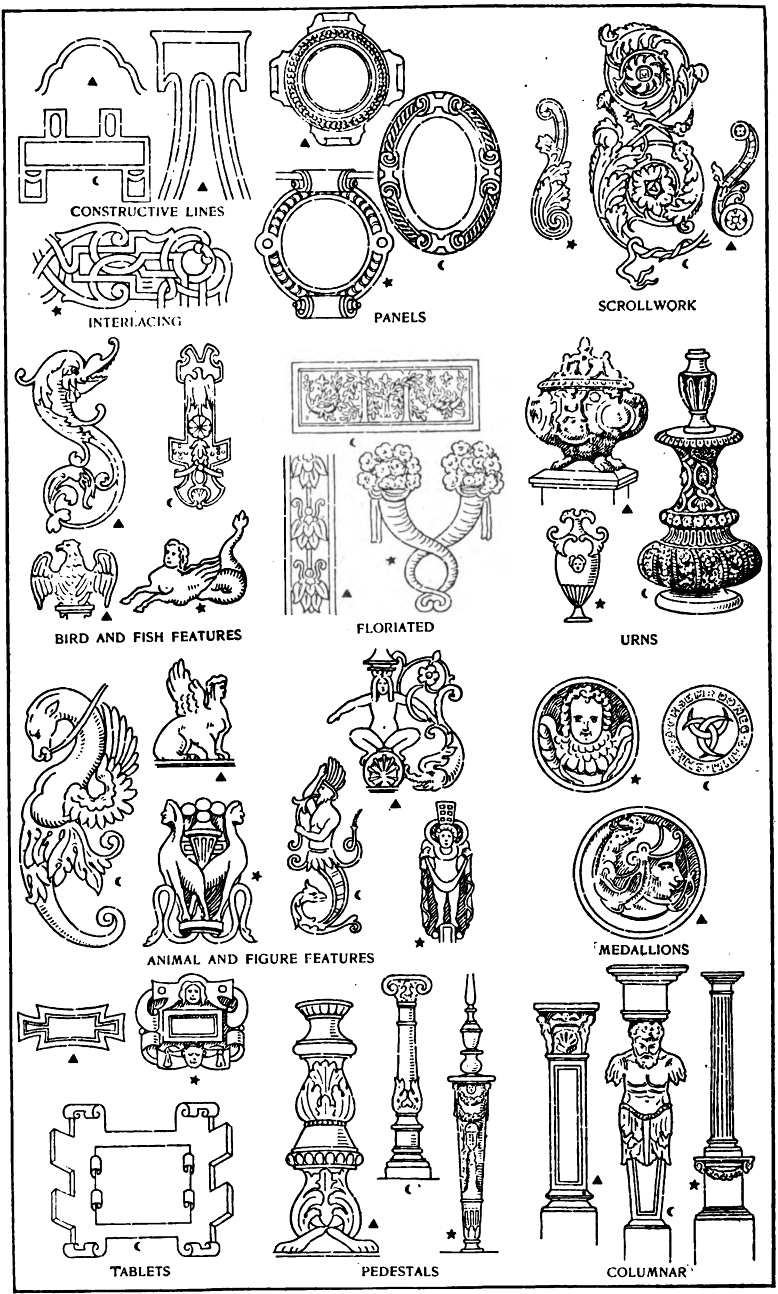

PANEL AND STRAPWORK
SCROLLS
FOLIATED
BIRD FORMS
DOLPHIN
GROTESQUES
URN AND CONSOLE
CARTOUCH AND PANEL
FIGURE WORK
1538
VASES
CAPITALS

FIG. 58

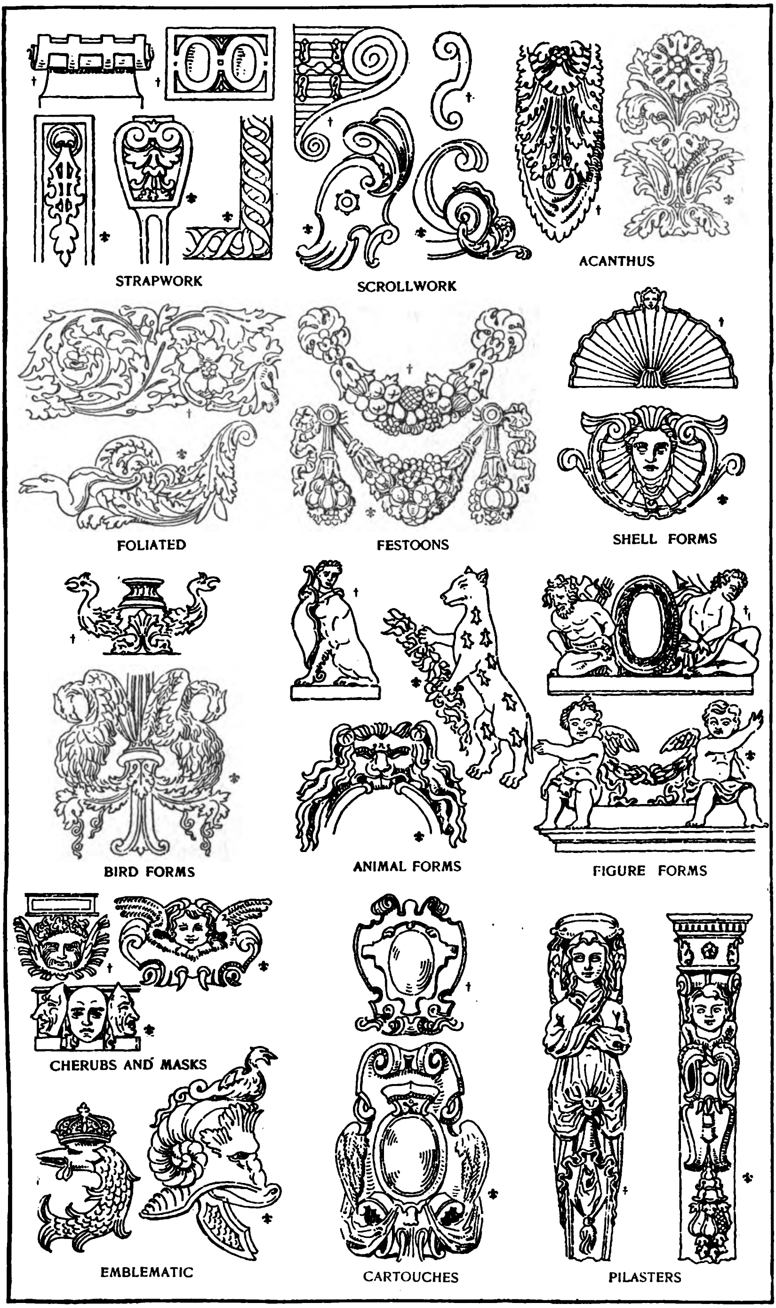
FRENCH RENAISSANCE DECORATION


CONSTRUCTIVE LINES
INTERLACING
PANELS
SCROLLWORK
BIRD AND FISH FEATURES
FLORIATED
URNS
ANIMAL AND FIGURE FEATURES
MEDALLIONS
TABLETS
PEDESTALS
COLUMNAR

Francis I-▲ Henry II-☾ Henry III-★

FIG. 59

FRENCH RENAISSANCE DECORATION


STRAPWORK
SCROLLWORK
ACANTHUS
FOLIATED
FESTOONS
SHELL FORMS
BIRD FORMS
ANIMAL FORMS
FIGURE FORMS
CHERUBS AND MASKS
EMBLEMATIC
CARTOUCHES
PILASTERS

Henry IV-† Louis XIII-⚜

Fig. 60

work is admirable in composition and proportion and somewhat more formal and sober than that under Francis I. The motifs include the cartouch, the grotesque mask, fruits, trophies, weapons, ribbons, and the male and female torso; the crescent (a symbol of Diana of Poitiers), and the intertwined initials H and D are characteristic of this period.

The decoration under Henry III does not differ materially from that under his father, Henry II, except that it is somewhat heavier and not quite so refined and graceful.

52. **Bourbon Period.**—The Bourbon period begins with Henry of Navarre, or Henry IV, and here, as in the previous period, is found the grotesque head, fruits, ribbons, and cartouches; see Fig. 60. The human torso and the mask do not find such general use, but the human figure is used freely and in a realistic manner—filling the niche, being seated amid the arabesque, or lying in the panel. The classic garland and the encarpus also appear frequently in the ornament of this period.

Upon comparing the style of the Bourbon period under Louis XIII with that under Henry of Navarre, it will be discovered, first, that paneling has attained prominence, often assuming the form of cartouches centered with a mask or grotesque head. The ribbons, cartouches, etc. now have flamboyant outlines, and the general effect is larger in scale than in the Henry IV style. Broken pediments filled with cartouches are used, as shown in Fig. 60, but have become more popular in later years.

The motifs employed include cartouches, fruits, pendants, war accouterments, cupids, encarpi, and masks. The cartouch is of a very liberal size, and at times grotesquely formed. The rims of the fruit pendants are provided with curling tendrils of bulky proportions, which sometimes assume representations of grotesque human features. Consoles with the broken curves were used, with acanthus leaves on the face.

The Bourbon style under Louis XIV, which precedes the Rococo shows indications of the coming lack of restraint and flamboyant qualities that were spoken of as occasionally appearing during the reign of Louis XIII in the outline of cartouches,

FRENCH RENAISSANCE (LOUIS XIV) DECORATION

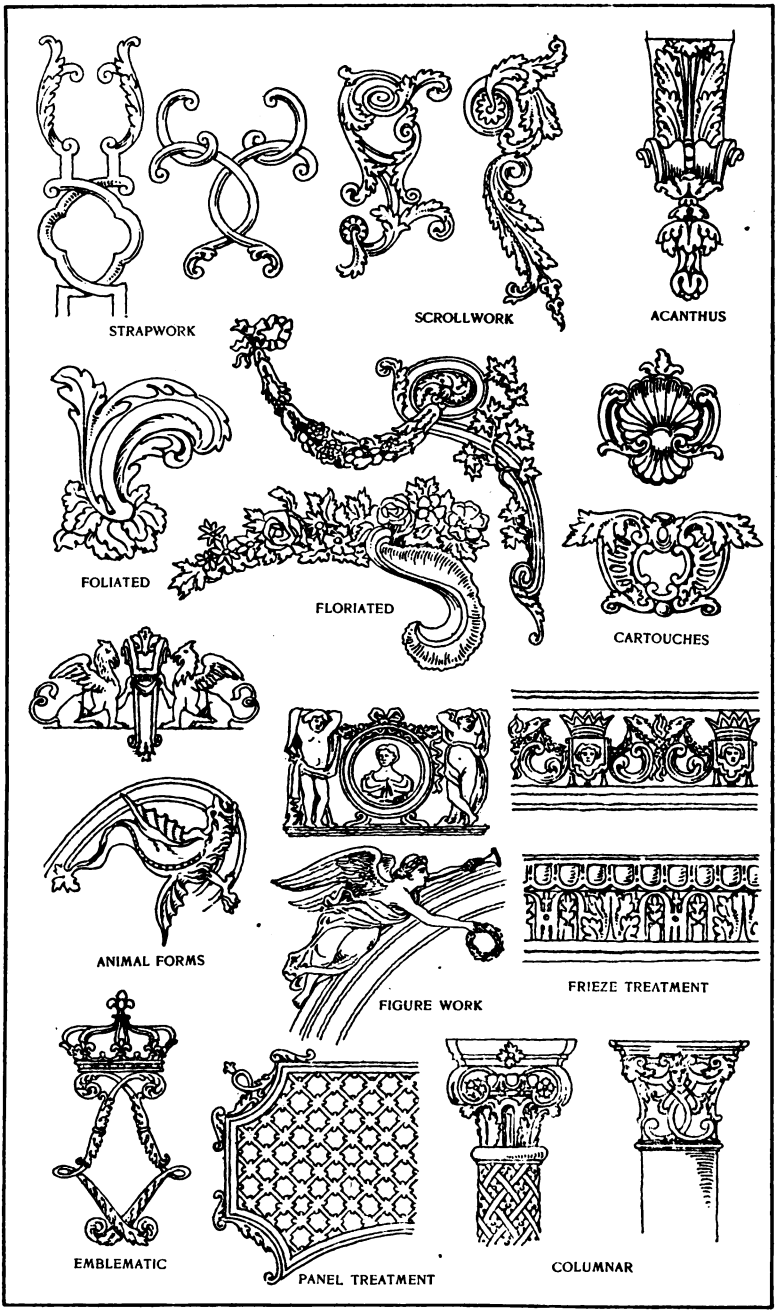

STRAPWORK
SCROLLWORK
ACANTHUS
FOLIATED
FLORIATED
CARTOUCHES
ANIMAL FORMS
FIGURE WORK
FRIEZE TREATMENT
EMBLEMATIC
PANEL TREATMENT
COLUMNAR

Fig. 61

etc. Outlines are not so definite nor so well studied as heretofore, and although rich and full of charm, this tendency toward degeneracy is plainly to be seen; see Fig. 61. The decorative work under Francis I and Henry II is just as rich and lavish as that under Louis XIV, but it possesses in addition the qualities of restraint and dignity.

These remarks must not be understood as suggesting that the decorative work of this period lacks charm or merit, for much of it is indeed very beautiful. Some of the shell and panel decorations and the capitals of columns are very original and pleasing. Shell forms are characteristic of this and the Rococo period, and latticed backgrounds, grotesque masks, griffins, satyrs, strapwork, encarpi, birds, and the human figure are among the motifs found during this period.

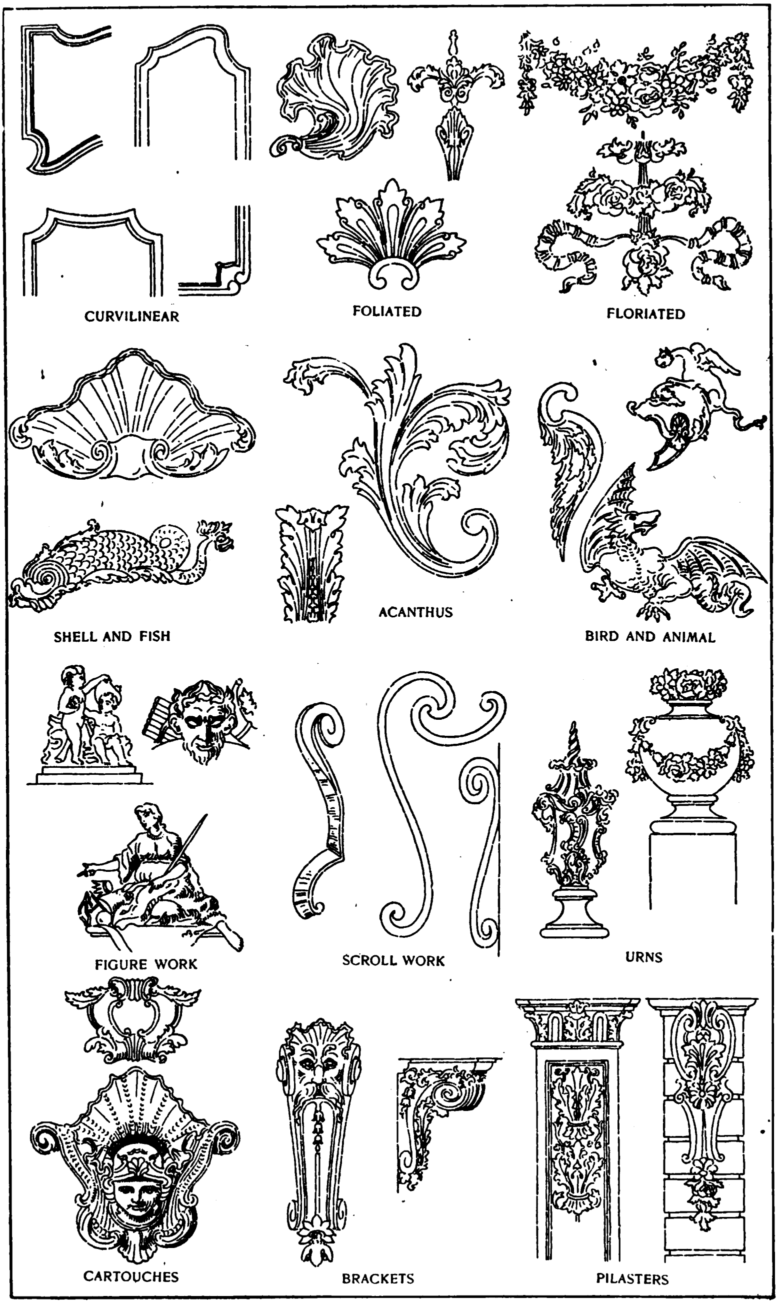
53. Rococo Period.—The tendencies displayed in the previous style found their culmination in the *Rococo*, which is the name given to the style in the time of Louis XV. As the reign of this king was without restraint, so the art displays a gaiety, abandon, and lack of logic that, despite qualities of cleverness and grace, displease and annoy; see Fig. 62. It precludes any one from enjoying this ornament except as a novelty, for there are characteristics that forbid the enjoyment of long-continued companionship with this decoration.

The flamboyant quality is very noticeable in the lines of cartouches and panelings. The distinguishing features of the Rococo style are the reversed curve, eccentrically shaped paneling, cartouch and shell motifs, and a dashing, swinging, wavelike quality to all the design work that cannot be found in any other style of French work.

The term *rococo* is used attributively by the French as applying not only to the art of this period, but in contempt of anything in art that is weakly pretentious, gaudy, or lacking in good taste.

54. While the style of design during the reign of Louis XVI has been classed with Rococo simply as a matter of convenience in arrangement, it has no resemblance to the Rococo, and shows a decided reaction toward the classic and Italian schools. In

FRENCH RENAISSANCE (LOUIS XV) DECORATION



CURVILINEAR

FOLIATED

FLORIATED

SHELL AND FISH

ACANTHUS

BIRD AND ANIMAL

FIGURE WORK

SCROLL WORK

URNS

CARTOUCHES

BRACKETS

PILASTERS

Fig. 62

FRENCH RENAISSANCE (LOUIS XVI) DECORATION

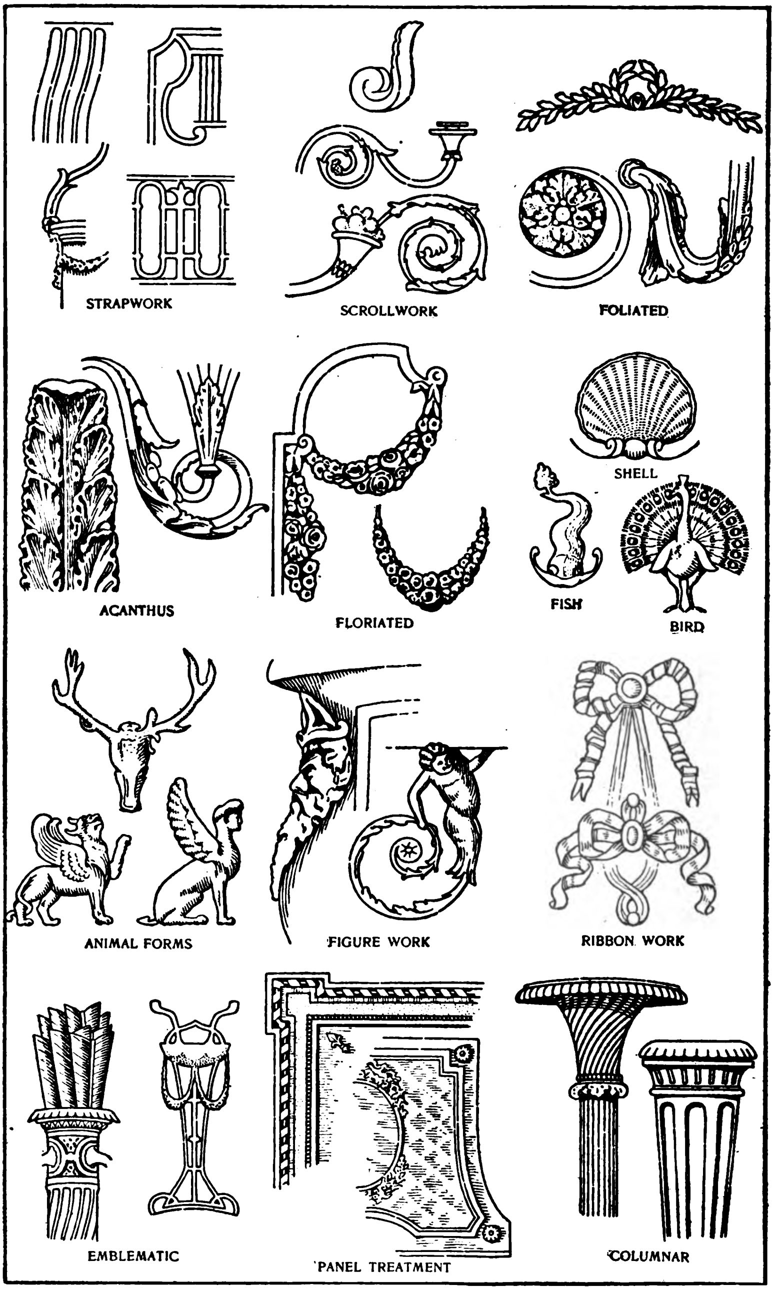
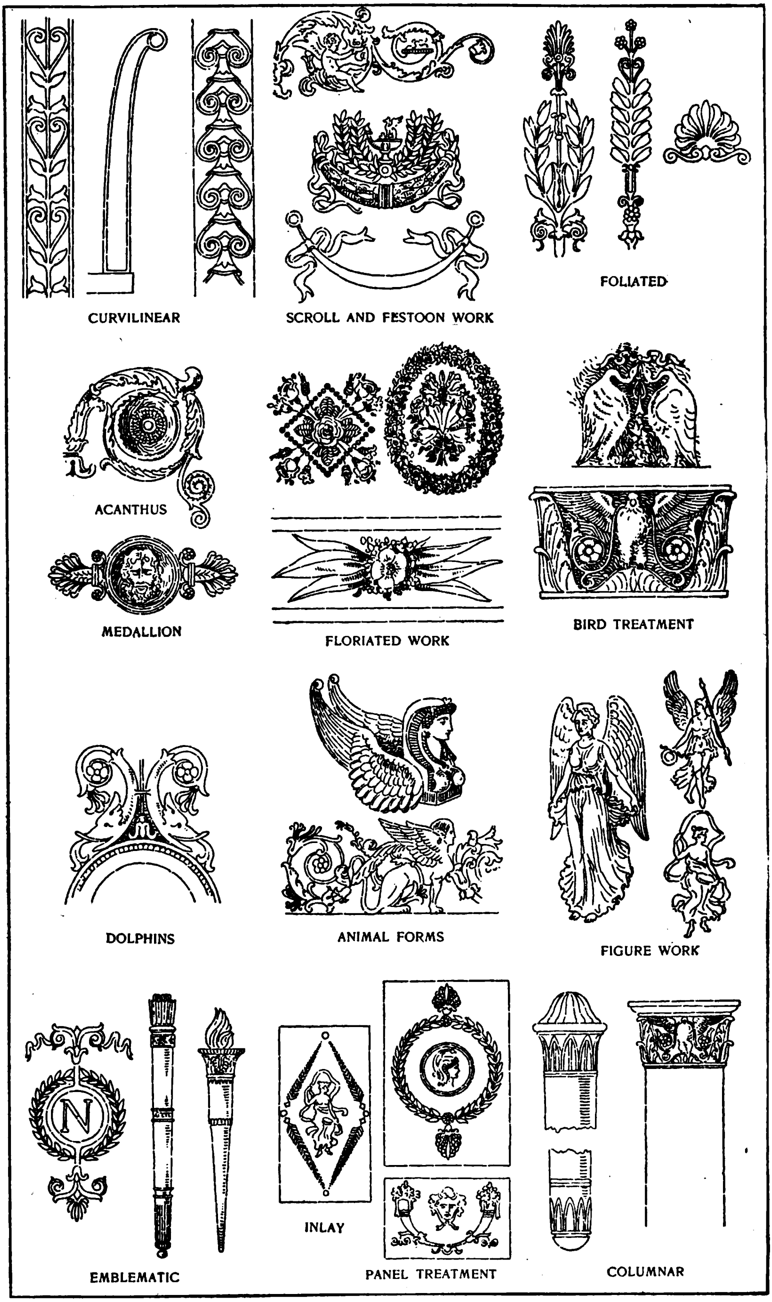

STRAPWORK
SCROLLWORK
FOLIATED
ACANTHUS
FLORIATED
SHELL
FISH
BIRD
ANIMAL FORMS
FIGURE WORK
RIBBON WORK
EMBLEMATIC
PANEL TREATMENT
COLUMNAR

FIG. 63

FRENCH RENAISSANCE (EMPIRE) DECORATION



CURVILINEAR

SCROLL AND FESTOON WORK

FOLIATED

ACANTHUS

MEDALLION

FLORIATED WORK

BIRD TREATMENT

DOLPHINS

ANIMAL FORMS

FIGURE WORK

EMBLEMATIC

INLAY

PANEL TREATMENT

COLUMNAR

Fig. 64

fact, there is a little Renaissance within the Renaissance, a reformation that culminated in the Empire period under Napoleon Bonaparte, in which the citizens even adopted a classic dress.

The motifs used in the decorative work under Louis XVI include garlands of fruits and flowers, pine-cone finials, palms, griffins, cherubs, vases, and other Roman examples. The borders of panels, etc. are a great contrast to those of the Rococo period, being in straight lines, which are only broken rectangularly. For molding and band decoration, the pearl, the fret, and the guilloche are resorted to; see Fig. 63.

55. Empire Period.—The decorative style of the Empire period is a further step in the classic direction; see Fig. 64. Probably the most distinctive quality of this style is the use of the color scheme in connection with modeled devices, these being light upon a dark ground or vice versa. The furniture in this respect is very striking, the decorative work being of gilded bronze or fine brass upon dark wood, stone, or marble. The rosette, wreath, olive branch, fleur-de-lis, and anthemion appear frequently, and the bee, Napoleon's emblem, was also often used.

SPANISH RENAISSANCE

56. Periods of Spanish Reniassance Style.—The Spanish Renaissance style may be divided into three periods; namely, *Early*, *Classic*, and *Rococo*.

During the *Early period* the classic influence was largely subservient to Gothic and Moorish tendencies, and the resulting work equals in richness and originality any other of Europe, not even excepting that of Francis I. The decorative work of the Early period is often called *plateresque*, because of its likeness to the work of silversmiths.

During the *Classic period* the classic design work increased its influence, and the work is not so pleasing as that of the Early period.

The vagaries shown in the *Rococo period* are practically the same as those found in the other styles of the Renaissance when in their decadence.

The motifs found in the Spanish Renaissance style include medallions, pilasters, columns, and other arabesques of great richness and grace, and shields, armorial bearings, and bracketed capitals. The ironwork of the Spanish Renaissance is unexcelled by any other style or nation.

GERMAN RENAISSANCE

57. Periods of German Renaissance Style.—The decoration of the German Renaissance—from 1500 to 1650—is inferior to that of England or France during the same period. The best work was accomplished during the development of the style that may be divided into *Early*, *Late*, and *Baroque*, or *Rococo*. At its best, the German style is characterized by heaviness and crudity, but shows great cleverness in the invention of the grotesque, such as satyrs, masks, griffins, and elves, especially in wrought-iron work and wood carving, in which it excelled.

In the use of geometrical figures, armorial bearings, bosses, spirals, paneling, festoons, garlands, etc., their work is similar to the Elizabethan and Flemish and the Renaissance of Henry IV, but it falls short of them all in grace and beauty, especially the Elizabethan, which is the most pleasing decoration of this quaint class.

The German Renaissance style must not be confused with modern German and Austrian decorative forms; which are quite unique and original, and bear no relation to the Renaissance forms.

ENGLISH RENAISSANCE

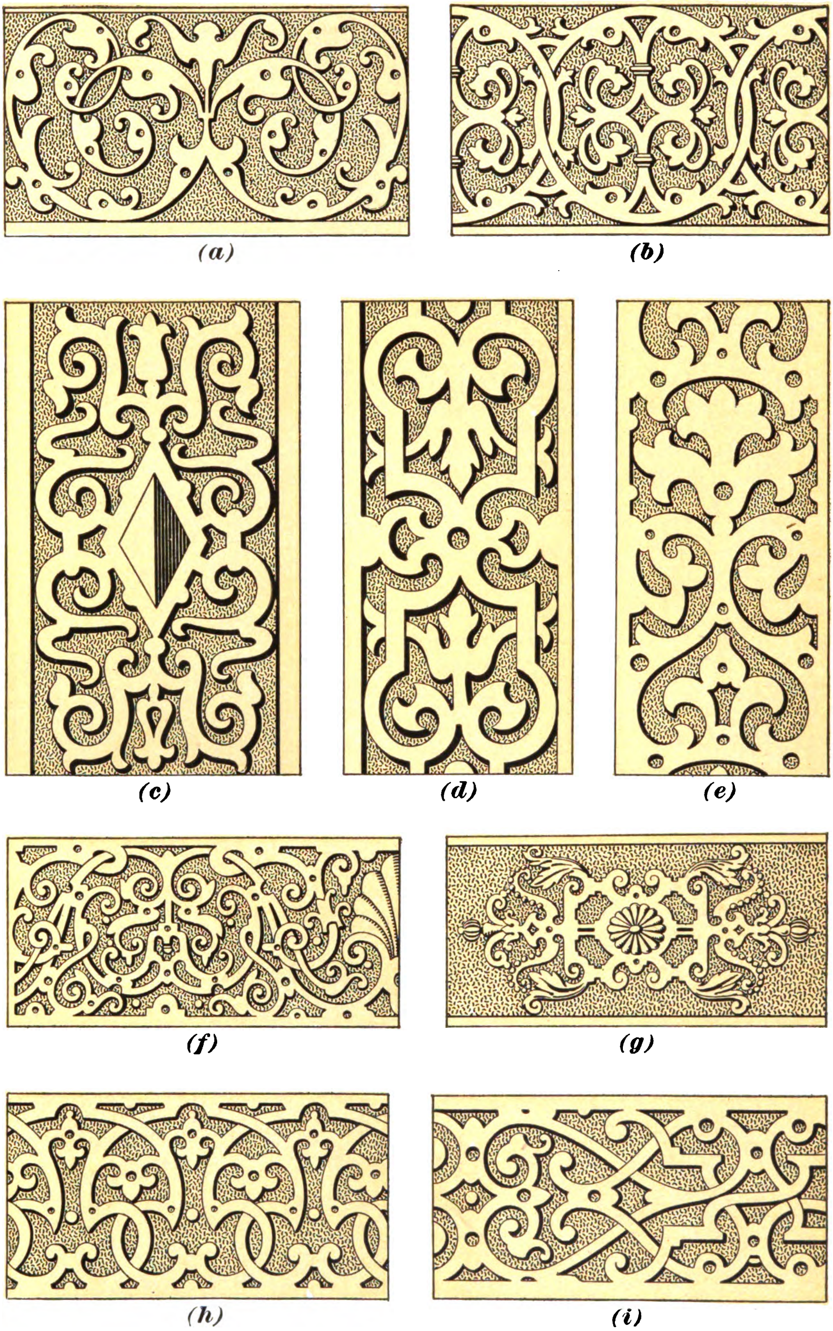
58. The Elizabethan Style.—Under the reign in England of Queen Elizabeth (1558 to 1603 A. D.) and extending partly into that of James I, a transition style called the Elizabethan was developed, occupying the period from the preceding Tudor style to the Jacobean and Renaissance of Sir Christopher Wren and Inigo Jones. This style is never free from the influence of the preceding Gothic, and is sometimes difficult to distinguish from Flemish and German Renaissance of earlier periods. The Elizabethan style died out completely on the death of James I, and has had little following, except in America, where in recent years it has become quite popular for domestic work, to which it is well suited.

A characteristic of this decorative work is the cartouch and the interlacing strapwork, with accompanying coats of arms, tapered pilasters, minute arches and pilasters, grotesques, ribbons, encarpi, etc. The volute and other curves, together with bosses and smaller studs, are much used in this style. Many of the motifs are not unlike those found under Francis I, and frequently the arabesques and interlacing strapwork suggest the Oriental in their richness.

59. The Jacobean Style.—The Jacobean style followed the Elizabethan, of which it was a development. This style gradually diverged from the Gothic picturesqueness toward the purer English Renaissance as the classic influence increased through the Italian artists that located in England, the English translations of Palladio, and the foreign education of the English architects Wren, Jones, Gibbs, and others. The characteristics of the Jacobean style are very similar to those of the Elizabethan period, a leaning toward the classic and a certain grossness being probably the only distinctive differences.

60. In Fig. 65 are shown various examples characteristic of the decorative work of the English Renaissance, and partly of the German Renaissance period. The decoration consists of a strapwork design interlaced with scrolls and grotesque patterns, as shown in Fig. 65, which were apparently secured to the surface by square-headed nails or rivets. This style of decorative treatment was used on pilasters, panels, spandrels, etc., and even pierced through parapets to form a sort of openwork balustrade, as shown in Fig. 66 (*a*). Grotesque figures were used on newels and as terminals to supports, instead of regularly molded columns and capitals, as in (*f*). Some columns were rusticated by the introduction of prismatic forms that were either carved in the shaft or inserted in colored stones, as in (*d*). Plaster was run in molded panels for ceilings, and considerable richness of design resulted from this treatment.

ENGLISH AND GERMAN RENAISSANCE DECORATION


(a) (b)

(c) (d) (e)

(f) (g)

(h) (i)

Fig. 65

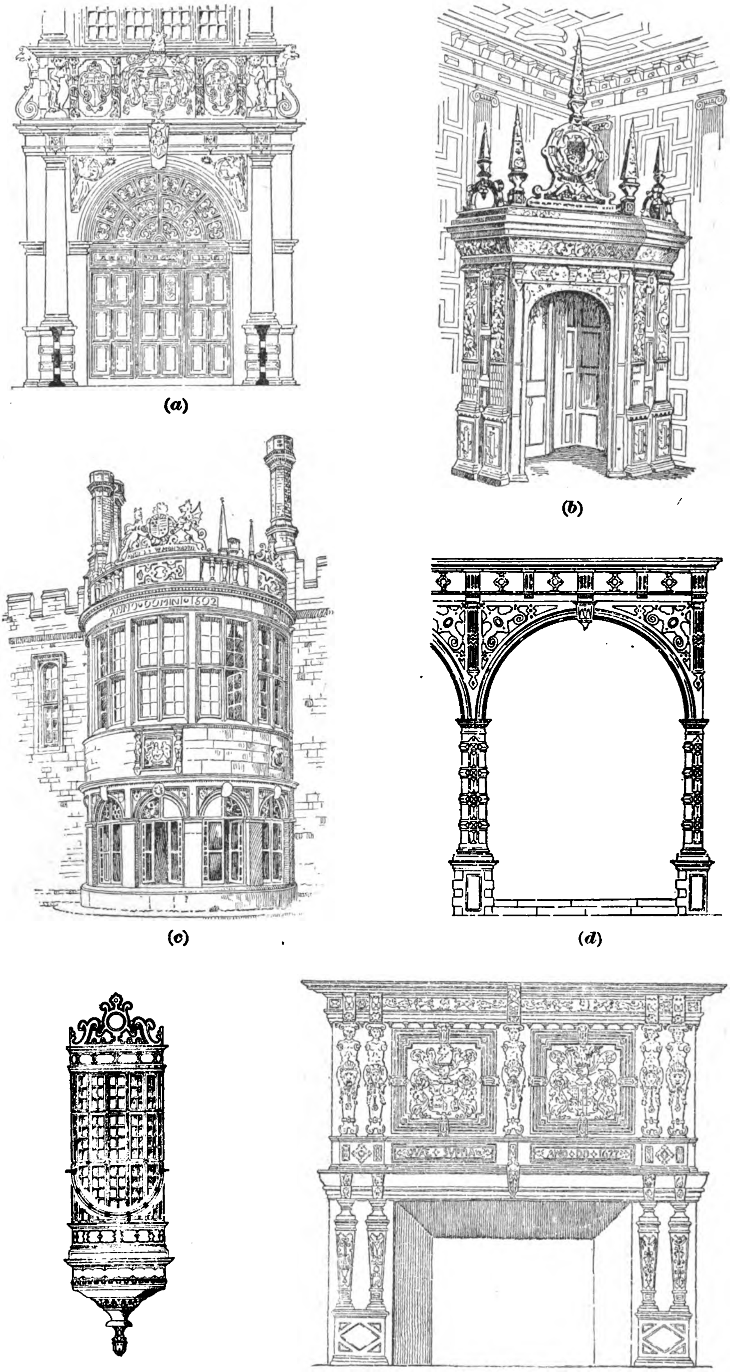

(a)
(b)
ANNO DOMINI 1602
(c)
(d)
(e)
QVAE SVPRA
ANO DO 1627
(f)

FIG. 66

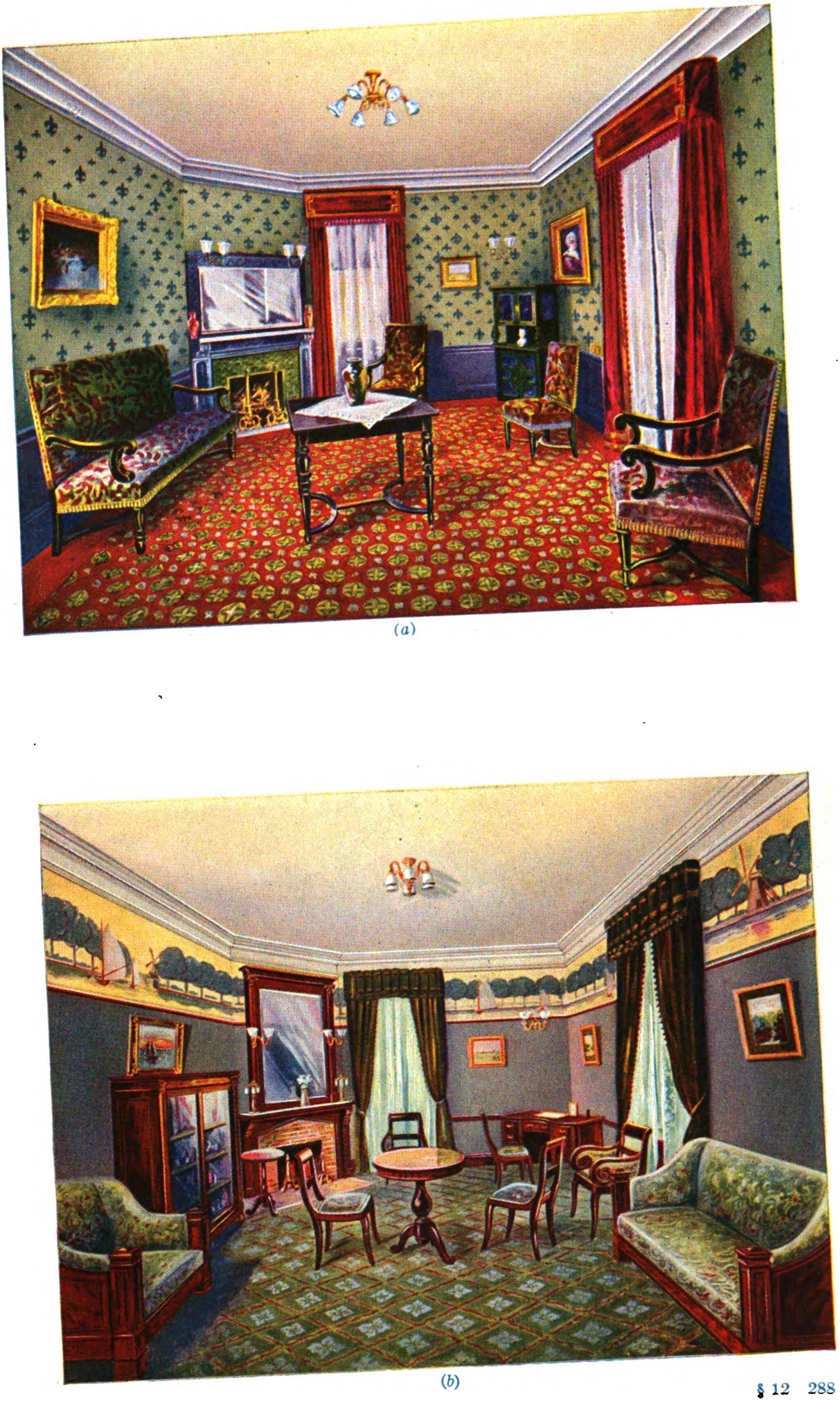
Pyramidal finials were carried on pedestals over screens and bays, as in (*b*), and molded strapwork filled the spandrels, as in (*d*). Bay and oriel windows characterized the exterior walls of the residences, as in (*c*) and (*e*), and the chimney stacks were carried high above the parapet walls and battlements in octagonal prisms.

The details shown in Figs. 65 and 66 can be classified as Renaissance on account of their historic period rather than on account of their classic spirit. England was not in harmony with the Italian movement and borrowed many of her ideas from Holland, which, being a Protestant country, was more in sympathy with the English church. The Gothic style, which was the expression of true structural conditions, still influenced the English style as to form, but the Elizabethan decorative work was independent of construction even when based on Gothic types.

61. The Cromwellian, Queen Anne, Georgian, and Other Styles.—The English Renaissance styles may be subdivided into many subordinate groups, depending upon the avenue in which the particular decorative style was employed. As far as pure decoration, as such, is concerned, the subdivisions so far considered about cover the field of the English Renaissance style. If, however, one were to select some definite industry, or definite field of structural designing, such as furniture, for instance, it would be found that other periods of English design existed, named according to the rulers at a certain period or the designers of a certain style of furniture.

Thus, after the Elizabethan period there comes a break of eleven years, called the **Cromwellian** period, after Oliver Cromwell. Then there is the **Queen Anne** period, which was the mother of the American Colonial style to be considered later, after which came the **Georgian** period, again named after England's ruler. It was in the Georgian period that the Dutch style, carried into England by William and Mary, was at first imitated, then developed, by English designers.

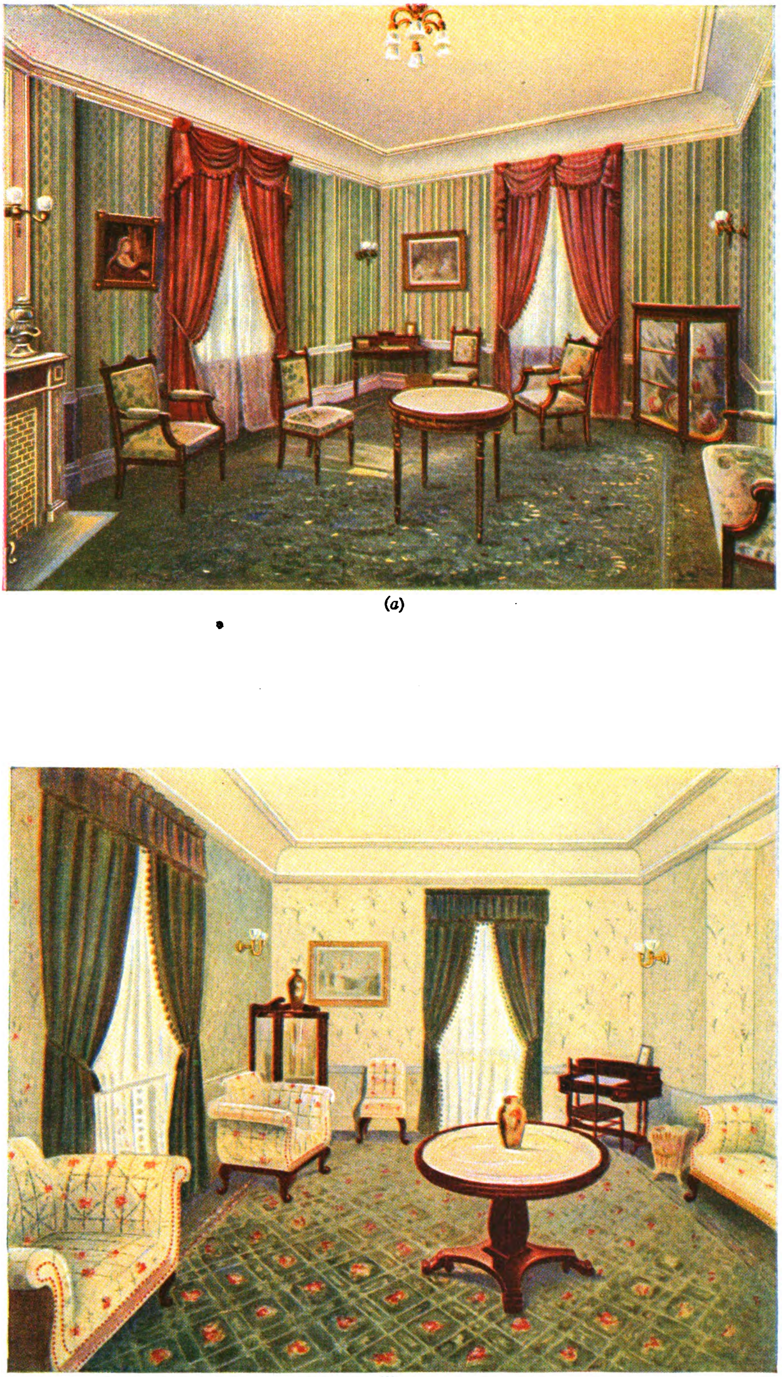
62. The characteristics of decoration in the Georgian period are found associated with the designers of several styles of



(a)

(b)

Fig. 70



(a)

(b)

FIG. 71

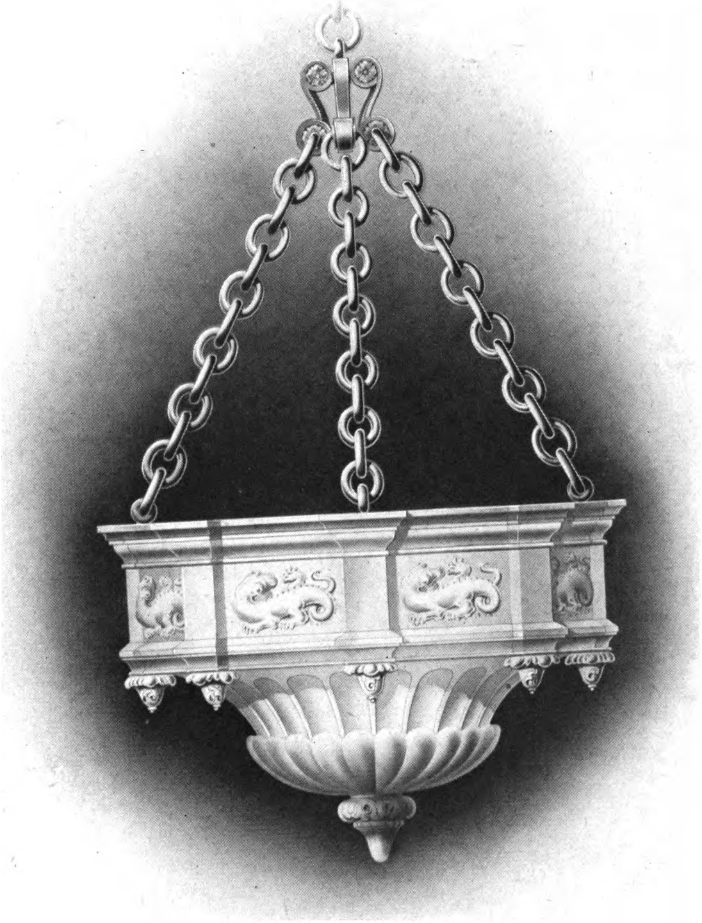


FIG. 72

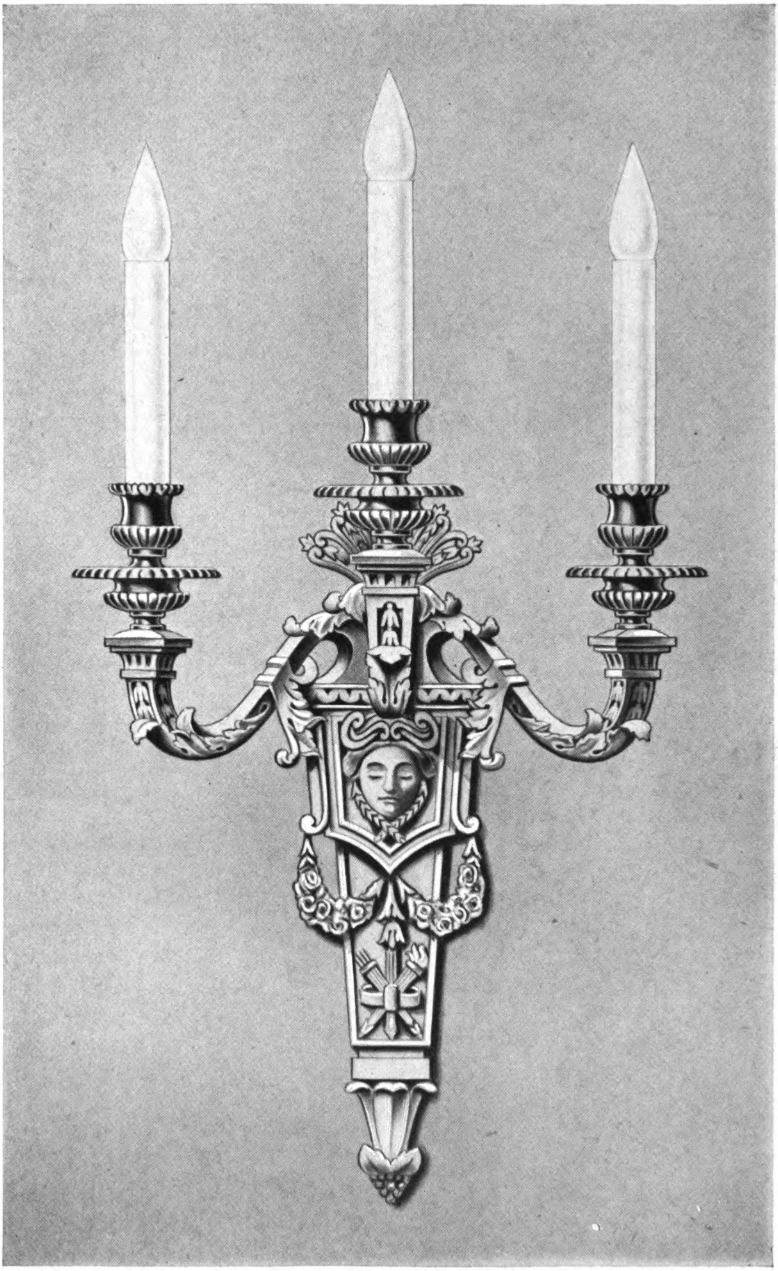


FIG. 73

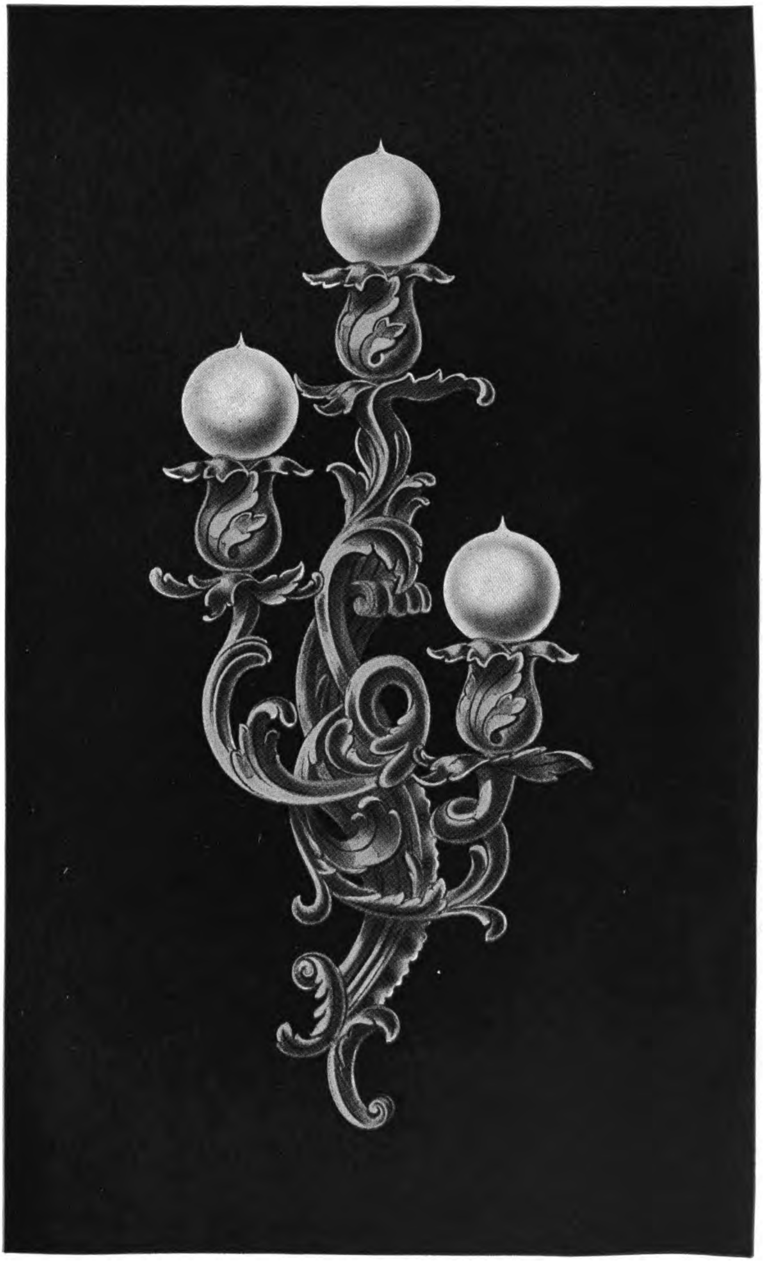


FIG. 74

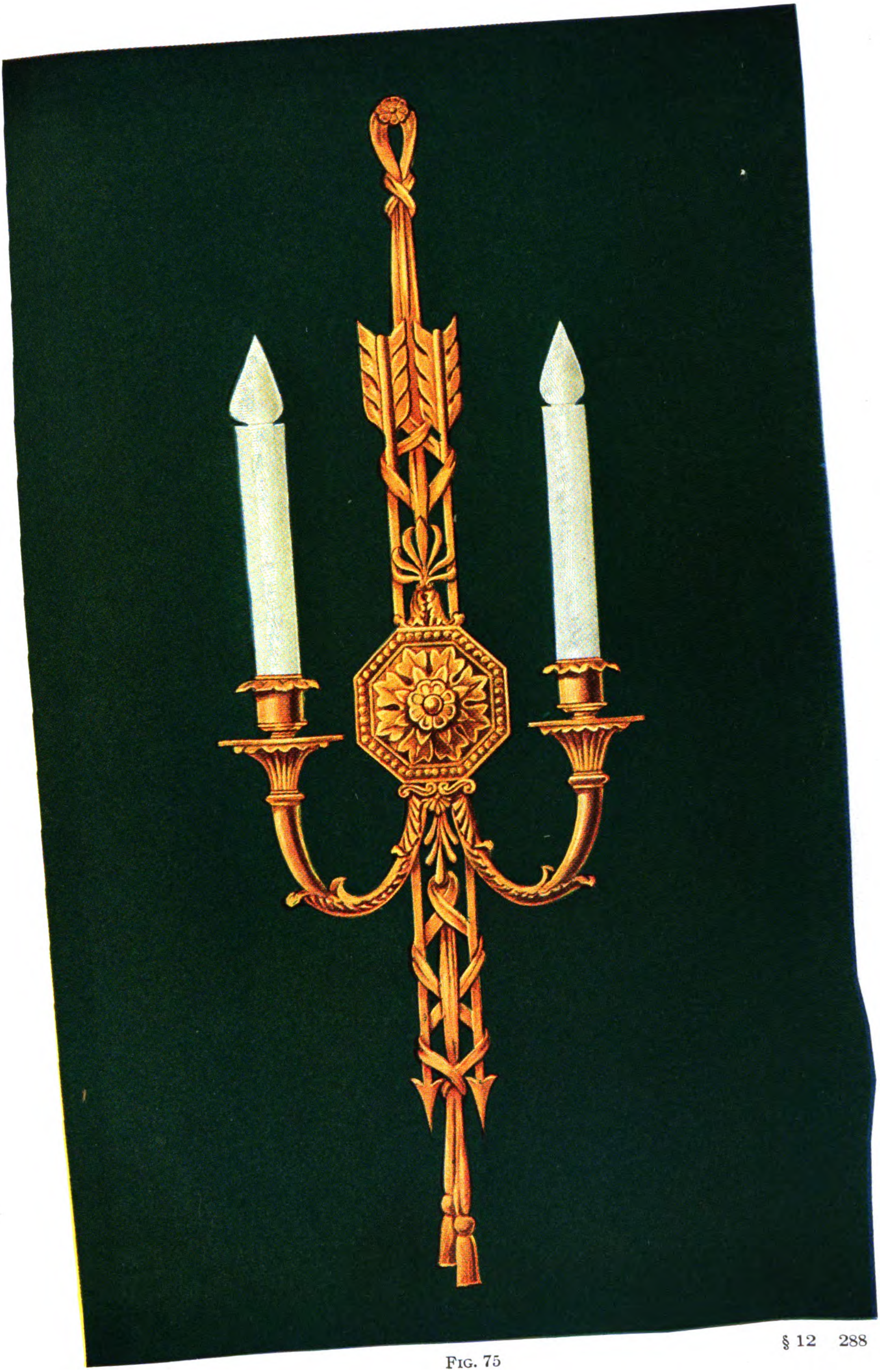


FIG. 75

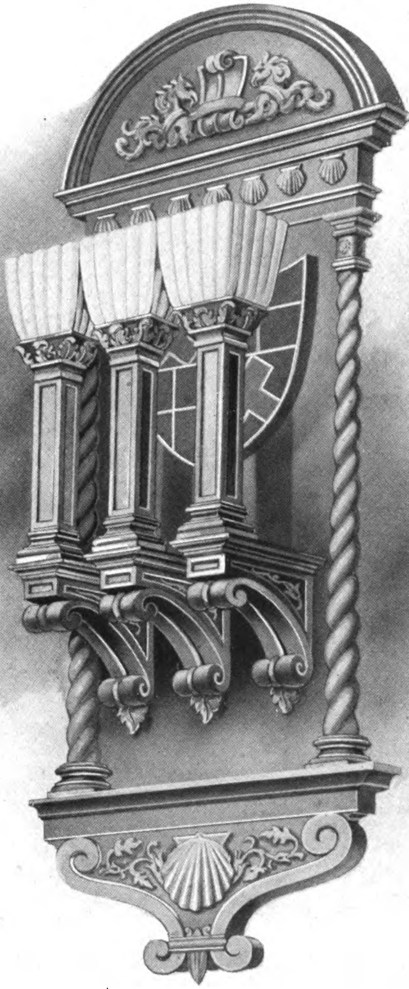


Fig. 76

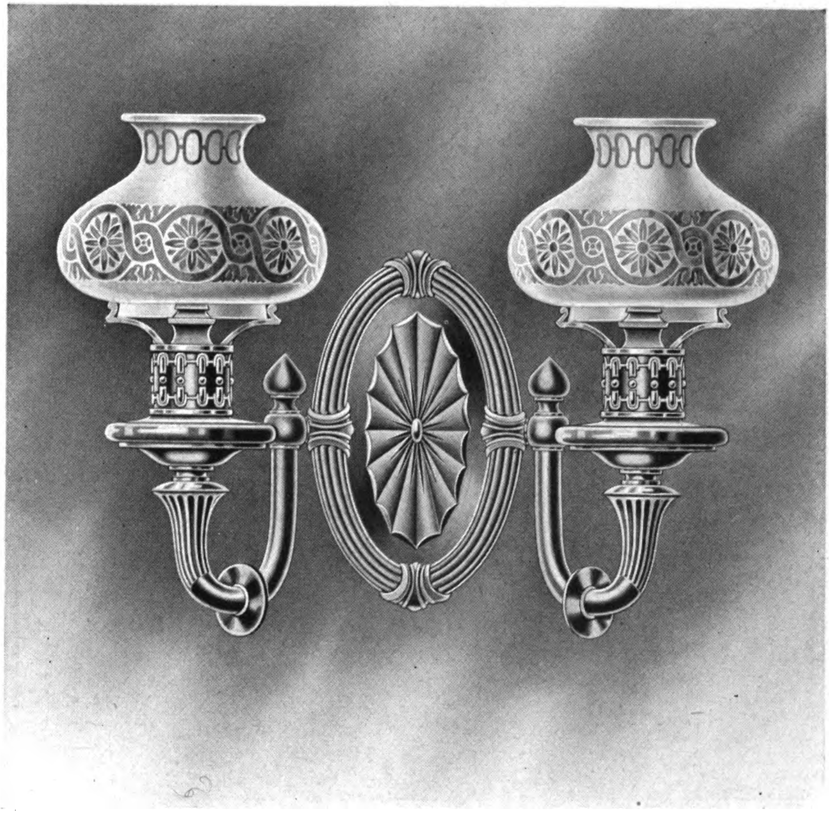


Fig 78

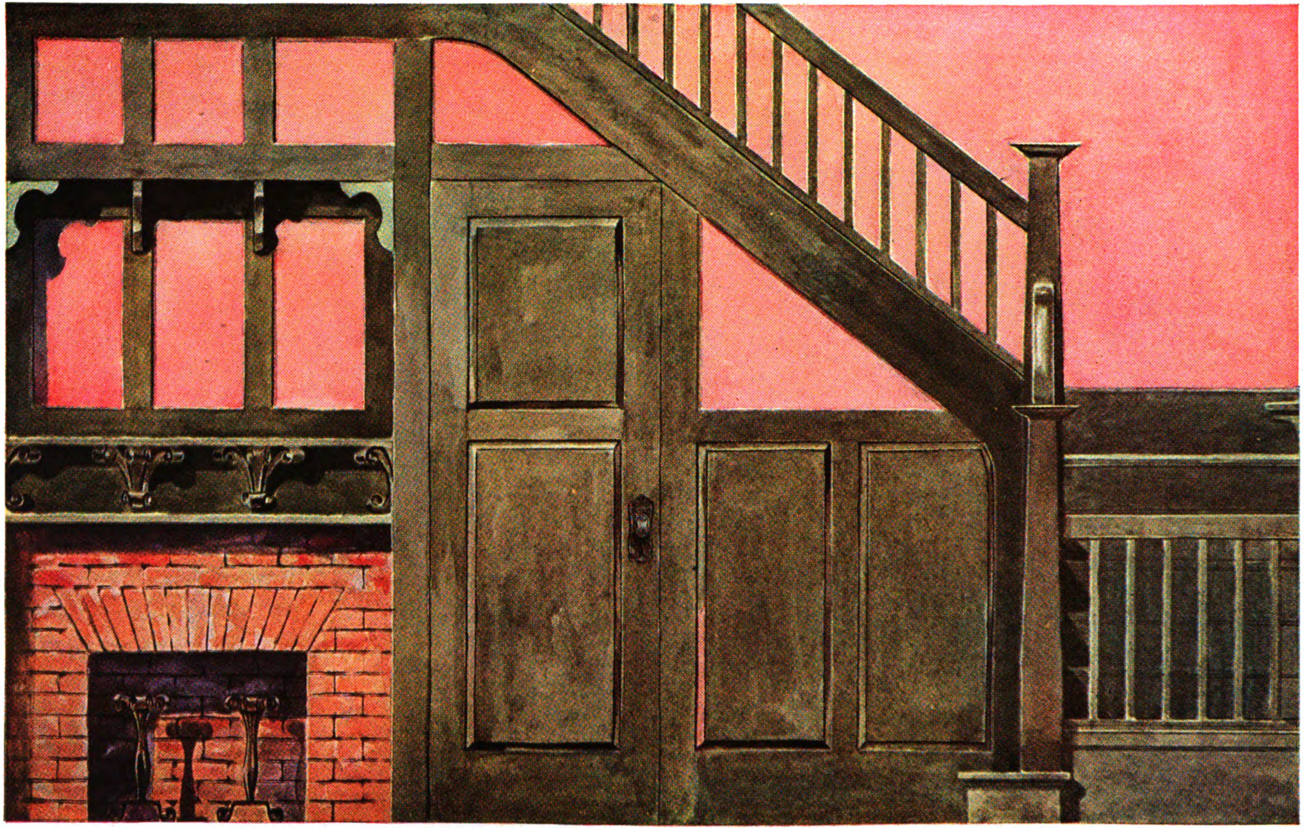


FIG. 79

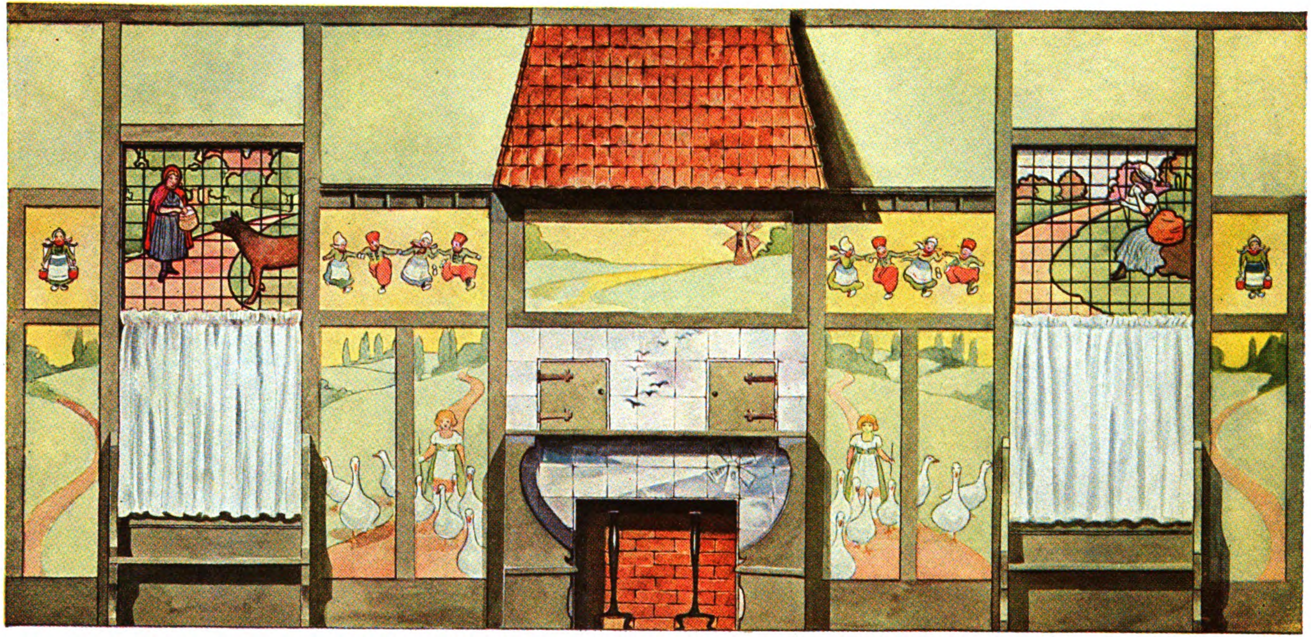


FIG. 80

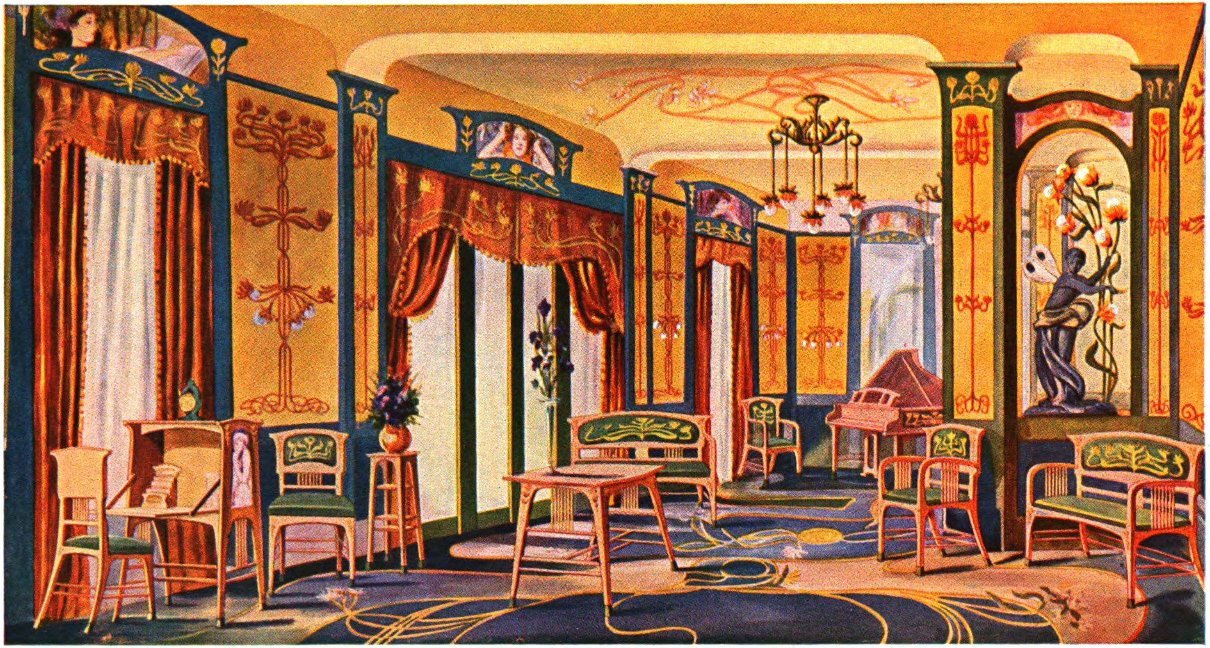


FIG. 82

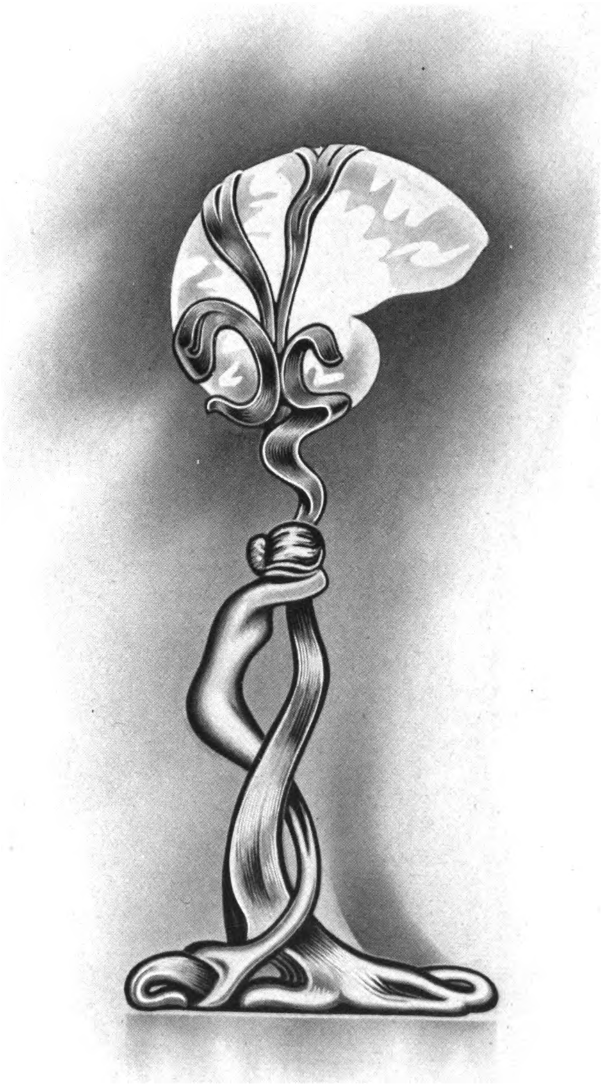


Fig. 83

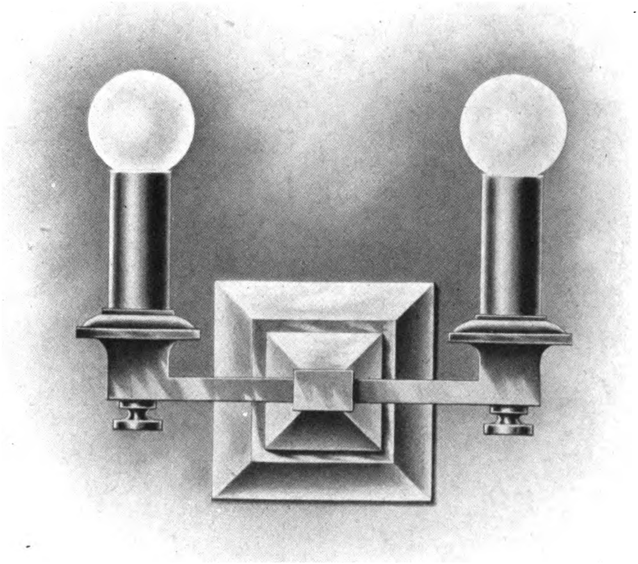


FIG. 85

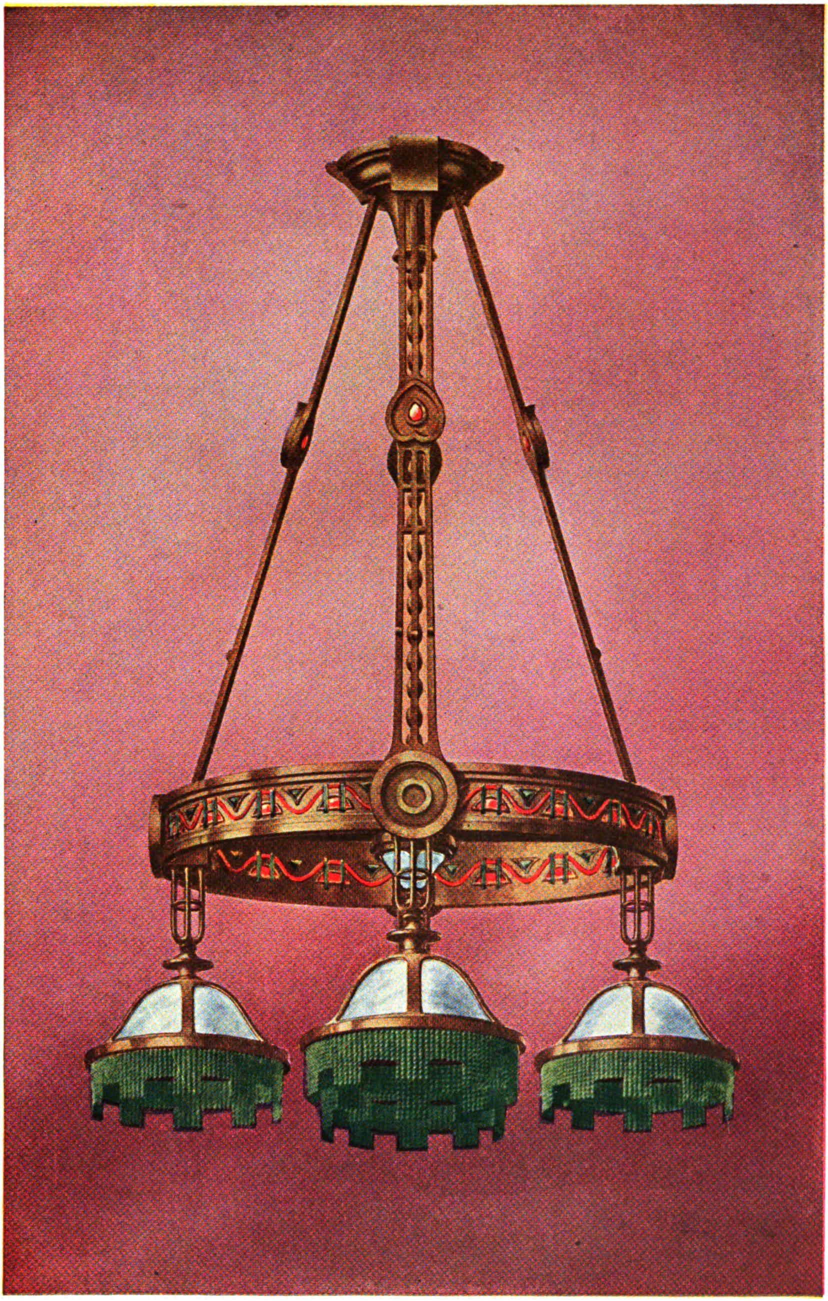
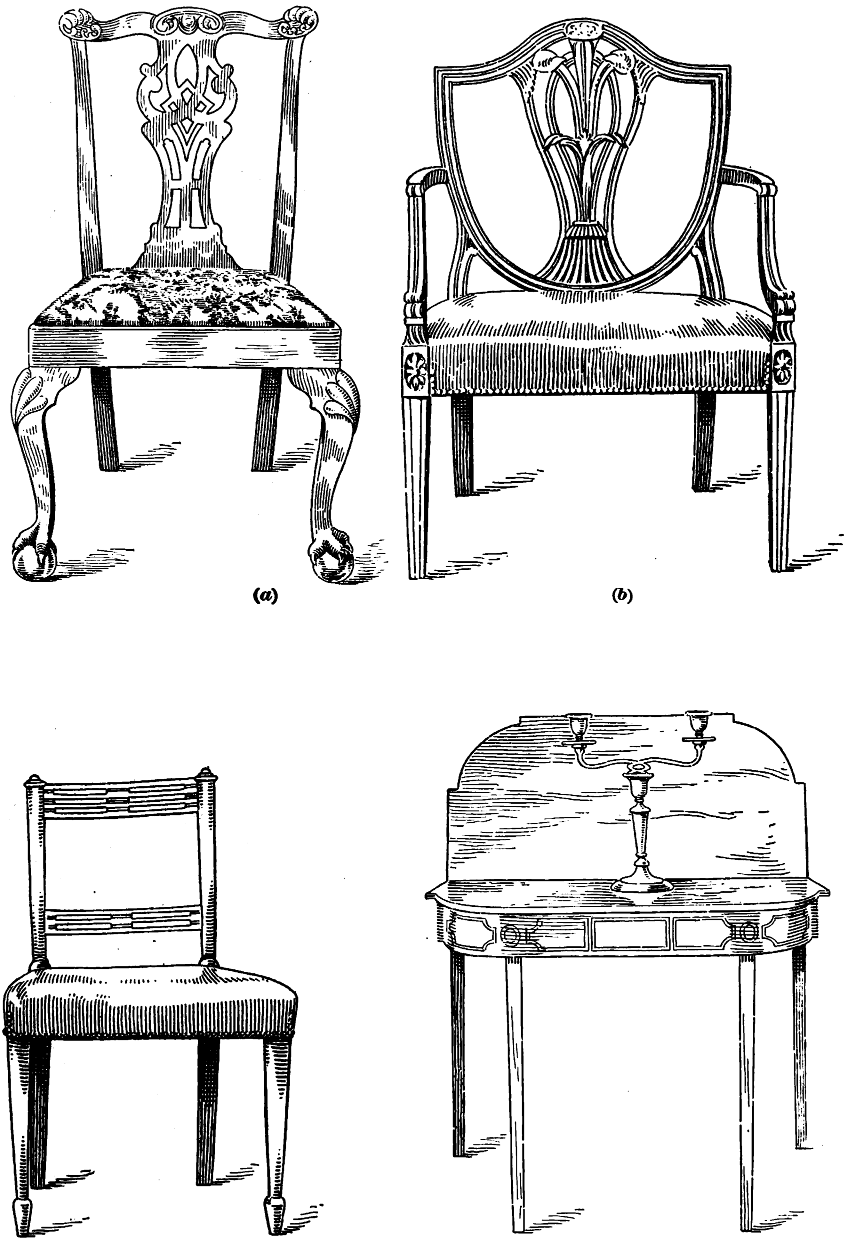


FIG. 86



(a) (b)

(c) (d)

FIG. 67

furniture and the imitators of these styles. Chippendale, Sheraton, Hepplewhite, and the Adam brothers dominated the character of the Georgian period.

Although these furniture styles of the Georgian period of the English Renaissance are not strictly necessary to the designer of decorative patterns, the design student should be familiar in a general way with these styles. Therefore, examples of each will be shown.

Chippendale adopted the cabriole leg of the Dutch chair and added to it the characteristic back of the French (Louis XV), as shown in Fig. 67 (*a*), working in mahogany.

Sheraton followed the simpler lines of the Louis XVI style, but worked in marquetry and inlay, and consequently introduced square legs to his furniture in order to provide suitable surfaces for inlay; examples of his designs are shown by the chair in Fig. 67 (*c*) and the table in (*d*).

Hepplewhite, like Sheraton, followed the lines of the Louis XVI furniture, but was not an imitator of the Sheraton style. Hepplewhite introduced the shield shape to the back of his chair, which was rarely upholstered but formed an open frame for a central carved or pierced design, as in Fig. 67 (*b*). The shield back of Hepplewhite chairs was closed at the top with an even, sinuous curve, while in the Sheraton chairs there was used a broken rail for the top rail of the back.

Robert Adam adopted satinwood as his favorite material, which became popular as a novelty. The Adam brothers also painted classic designs on the golden surfaces of the varnished satinwood, after the manner of inlay. The designs were executed in fine lines of classic detail and in soft colors. Occasionally the Adam brothers introduced woven cane into their chair backs, running the strands to conform to the outlines of the panels, whether oval or rectangular. Roman influence is evident in the work of the Adam brothers; in fact, their style of interior decoration and furniture is based on the classic and Pompeian styles, with influences from the French Empire period. The Adam style was also popular in American colonial homes, and it found many imitators in America. These designs were the prototype of American interiors that are characteristic of

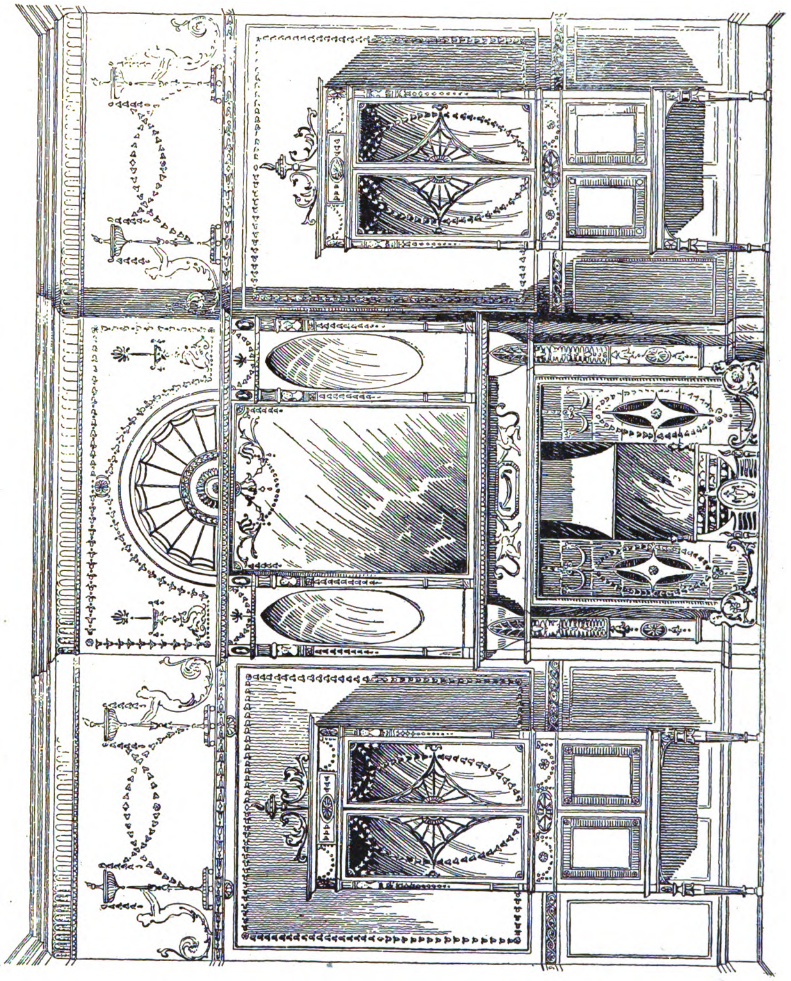


Fig. 68

the American colonial period. Pale colors were used; delicate tints of blue, red, and green formed either the background or the decoration, contrasting with which gold was used also, but sparingly. The scrolls and classic decoration were not rich and voluptuous, because English social conditions demanded more refinement. The Adam decorative work therefore became delicate and attenuated, retaining the delicacy of the Pompeian.

In Fig. 68 is shown a characteristic Adam side wall with a mantel and cabinets.

MODERN APPLICATIONS OF RENAISSANCE STYLES

63. Renaissance decorative work of all period styles—Italian, French, Spanish, German, and English—is used so extensively in modern work that it would be impracticable to show many examples or to discuss them. Only a few examples will therefore be presented.

In the interior decorations of banks, hotels, apartment houses, and other public buildings, the motifs of the Italian and French Renaissance styles are used bodily in their classic form, very much in the manner shown in Fig. 69. The scheme is to run beams across the ceiling, either structural or merely for decorative effect, and then fill with decoration the resulting squares and rectangles. Around the four walls of the room is then carried a rich cornice, upon which are apparently supported the beams forming the panels.

When the classic decoration is not used bodily, but the general style is adapted, as in the case of more domestic interior decoration, the system is different.

64. The method of adapting the Renaissance style to modern use is further shown in Figs. 70 and 71, which show four rooms that are almost identical in form and arrangement, but decorated in different periods. The treatment in Fig. 70 (*a*) is French of the Francis I period. Specifically, there is little to determine this in the design, except the form and upholstery of the furniture and the extreme simplicity of the details. The walls are unbroken by strong horizontal elements, and the spot-and-powder pattern of fleur-de-lis is the only typical French

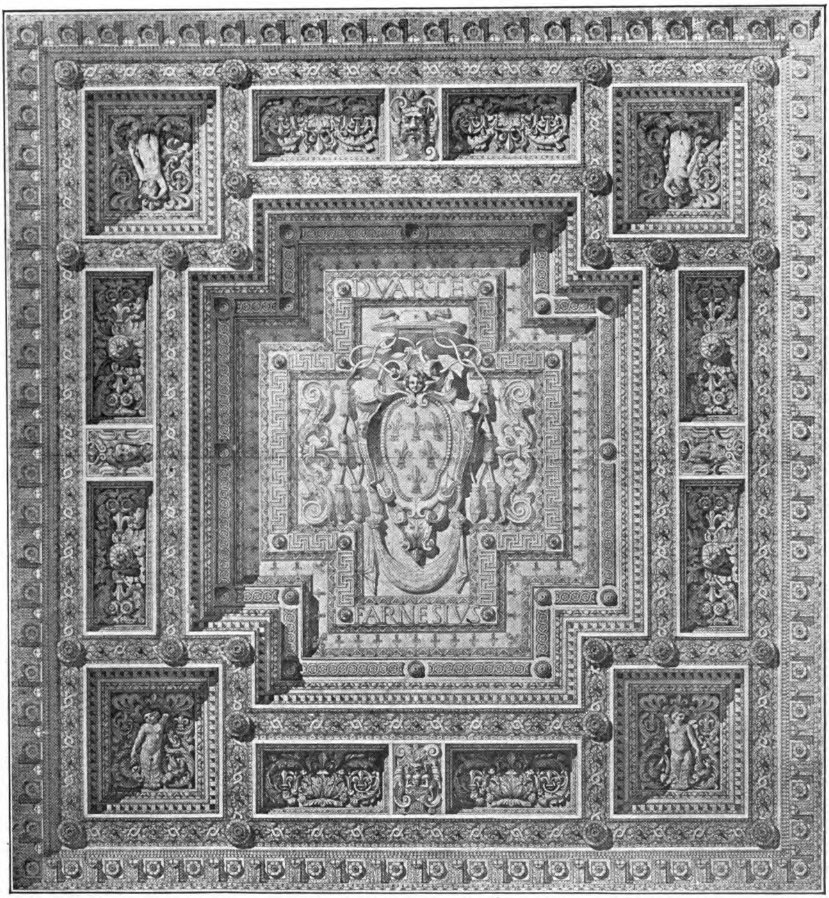

DVARTES
FARNESIVS

Fig. 69

element present. The hangings are extremely simple and well suited to the quiet dignity of the design.

In Fig. 70 (*b*), the decorative treatment, in Renaissance, is even simpler than that in the previous example. A solid color for the side wall, with a conventional frieze of Dutch landscape, forms a background for the green hangings and characteristic upholstery. The form of the chairs is more Greek than Flemish, and they do not seem so much in place as do the heavy sofas and the center table.

In Fig. 71 (*a*) is shown a treatment in the period of Marie Antoinette, while in (*b*) is shown a treatment intended to be Colonial. Here, the furniture alone gives the classification, as either room empty would pass as Colonial. The brocaded wall covering in (*a*) is not more characteristic of the French interior than of many of the early American mansions, but the form of the furniture and the upholstery, in simple figured fabrics, leaves no doubt as to the style intended. The Colonial interior, in (*b*), is so characteristic of the period that there is a feeling of complete harmony throughout the design.

65. In Figs. 72, 73, 74, 75, and 76 are shown examples of modern lighting fixtures designed along the lines of definite Renaissance styles, to be suitable for some definite interior decoration scheme of that particular period. These need not be discussed in detail, for it is evident, from each illustration, just how the typical motifs of the different Renaissance periods were employed on these modern fixtures, being *adapted* to modern use, but not copied slavishly.

French Renaissance, Francis I.—Fig. 72 shows a ceiling pendant electric light fixture of French Renaissance design, Francis I period. This fixture, used for the so-called indirect system of lighting, is constructed of alabaster, suspended with gold-plated chains, and so arranged that the whole front and bottom glows with light from the interior lamps.

French Renaissance, Louis XIV.—Fig. 73 is a reproduction of a three-light wall bracket designed in the style of Louis XIV. The clever way in which the decoration of this period is introduced is well worth close study.

French Renaissance, Rococo.—Fig. 74 shows an electric light fixture designed in the ornament characteristic of the Rococo period of the French Renaissance.

French Renaissance, Empire.—In Fig. 75 is reproduced a wall bracket of Empire design. The inverted parallel arrows with wrappings of cord and tassels, held in place by the octagonal rosette, distinctly show the trace of Roman origin in the Empire style, and are typical of that style.

Spanish Renaissance.—The wall-bracket fixture shown in Fig. 76 is an excellent example of the use of decoration of the Spanish Renaissance style in modern fixtures.

AMERICAN COLONIAL

66. Characteristics of American Colonial Style.—It is hardly correct to speak of the decorative work used in the American Colonial period—say from 1634 to 1815—as a distinct style, because, as has already been stated, the American Colonial style is an offspring of the Adam brothers' style of the English Renaissance; however, it is usually considered as a separate period style. It was brought to America by the colonists, and was probably at its best about 1730.

As a rule, the designs of this period are of modest pretensions compared with European work. Examples of this period are to be found in New England, Eastern New York, Eastern and Southern Pennsylvania, and Maryland, besides many other places throughout the Eastern and Southern states.

Among the motifs used are the acanthus, scallop shell, encarpus, rosette, bead and shuttle, dentil, egg and dart, fret, fillet, and others; see Fig. 77.

In Fig. 78 is shown an electric light fixture designed in the American Colonial style. The details of the decoration that have been introduced are strictly Colonial, and this fixture presents an exceedingly authentic application of this style.

In a treatise such as this, where only the main characteristics of the decorations and designs of the principal countries and nations can be considered, space will not allow the detailed

AMERICAN COLONIAL (18TH CENTURY) DECORATION

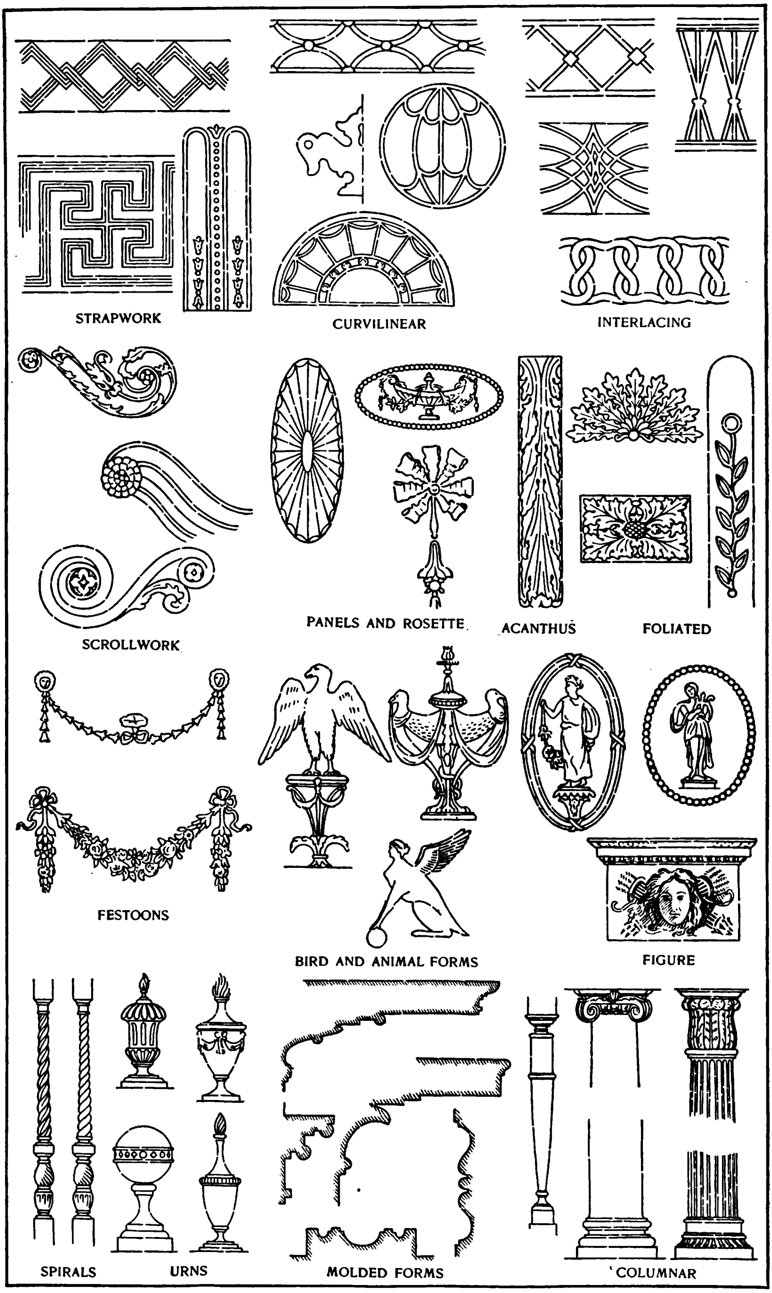

STRAPWORK
CURVILINEAR
INTERLACING
SCROLLWORK
PANELS AND ROSETTE
ACANTHUS
FOLIATED
FESTOONS
BIRD AND ANIMAL FORMS
FIGURE
SPIRALS
URNS
MOLDED FORMS
COLUMNAR

Fig. 77

discussion of any one period, such as the American Colonial, for instance. However, any one desiring to pursue the study of the Colonial style still further can find reference books in the public libraries that will be of interest and of value to him.

MODERN

67. Transition Period.—In using the term modern, in referring to decorative styles, the reference is to such work in the United States covering the period from 1800 up to and including the present time; that is, the 19th and the 20th centuries.

The 19th century produced nothing worthy of note in the way of a new style until its closing years. The Empire period had died in France with the downfall of Napoleon and the restoration of the monarchy. All the decorative ideas of the previous period being characterized strongly with the initial and devices of the emperor, they were speedily abandoned, and designers turned again to the scrolls and shells of Louis XV as being less obnoxious to the royalists. This had its influence in England, but not for any length of time, and an attempt was made to revive the Gothic style as being characteristically English. In the meantime, machinery was introduced for the manufacture of furniture and other decorative details, and under the dominating influence of the turning lathe and the scroll saw, the individuality of the designer and craftsman was hampered and restricted, and the designs of the day became meaningless and, in some cases, actually ugly.

Toward the end of the 19th century, a final effort was made to overthrow the hideous conceptions of the past fifty years and to establish something entirely new and worthy of an artistic people. This effort first showed itself in London, in what was termed the "æsthetic craze." A small coterie of enthusiasts "turned to nature" for inspiration, and produced designs in floral and other natural forms that were as inappropriate as they were novel. These æsthetes advocated the abandonment of all prevailing forms, even in dress, and recommended limp, flowing gowns and studied poses, while decorative surroundings were to be in trailing inert lines and the palest of colors. The idea was too absurd to gain popularity in this practical age, but it had the beneficial effect of diverting the public mind from copying the past. At this time, William Morris, the pioneer of the modern style, appeared and designed all manner of details in a new form that was based on nature and without historic precedent, except in underlying principles.

The Morris idea was simply to turn to nature for inspiration, instead of copying and recopying something that some person had done before. His designs were based on natural forms, but they never pretended to portray these forms naturalistically. Morris lectured, taught classes, and wrote books, thus gaining many followers, and the modern *Morris style* in England, the *Craftsman style* in America, *L'Art Nouveau style* in France, and the *Secession style* in Austria, are the outcome of this same idea. All four countries were working on the same principle, but they produced different results because of the different traditions that had influenced their history and the development of their crafts.

68. The Craftsman Style.—The style that resulted from the conditions just described can be summed up as a craftsman's style, no matter what its local application may be; for whether in England, in America, in France, or in Austria, it is based on the fundamental theory of designing to suit the material, purpose, and decorative possibilities of the article to which it is to be applied. In France, this style is deeply impressed with the influences of the better elements of the Louis XIV to Louis XVI styles. In furniture, it retains the shapes that were used during the time of Madam Pompadour and Marie Antoinette, but develops them with the details of the new style. In England can be seen the influence of the traditional Gothic; Germany and Austria run to grotesque and fantastic ideas; and in America, the crude forms of the Spanish Missions in California characterize the early efforts. But, taken all in all, the best results of this style are due to the training of the artist to be a craftsman, and the education of the craftsman along the lines of true art. The one may design and not execute, but he must thoroughly understand the possibilities of the craftsman and the tools employed in order to carry out the ideas set forth in the designs. The other may execute but not design, but he must be able to comprehend the artistic motives in the designer's mind.

Since one of the objects of the craftsman movement and style is to do away with superficial decoration, it is not practicable to show any examples of this style that are what is ordinarily termed decorative. The manner of decorating an interior or a wall surface in the Craftsman style is shown in Figs. 79 and 80. In the simple reception hall shown in Fig. 79 the walls were covered with a red cartridge paper, while the woodwork was worked absolutely plain and stained a weathered green. The result seems crude, but the design is very pleasing in its simplicity and at the same time is not expensive.

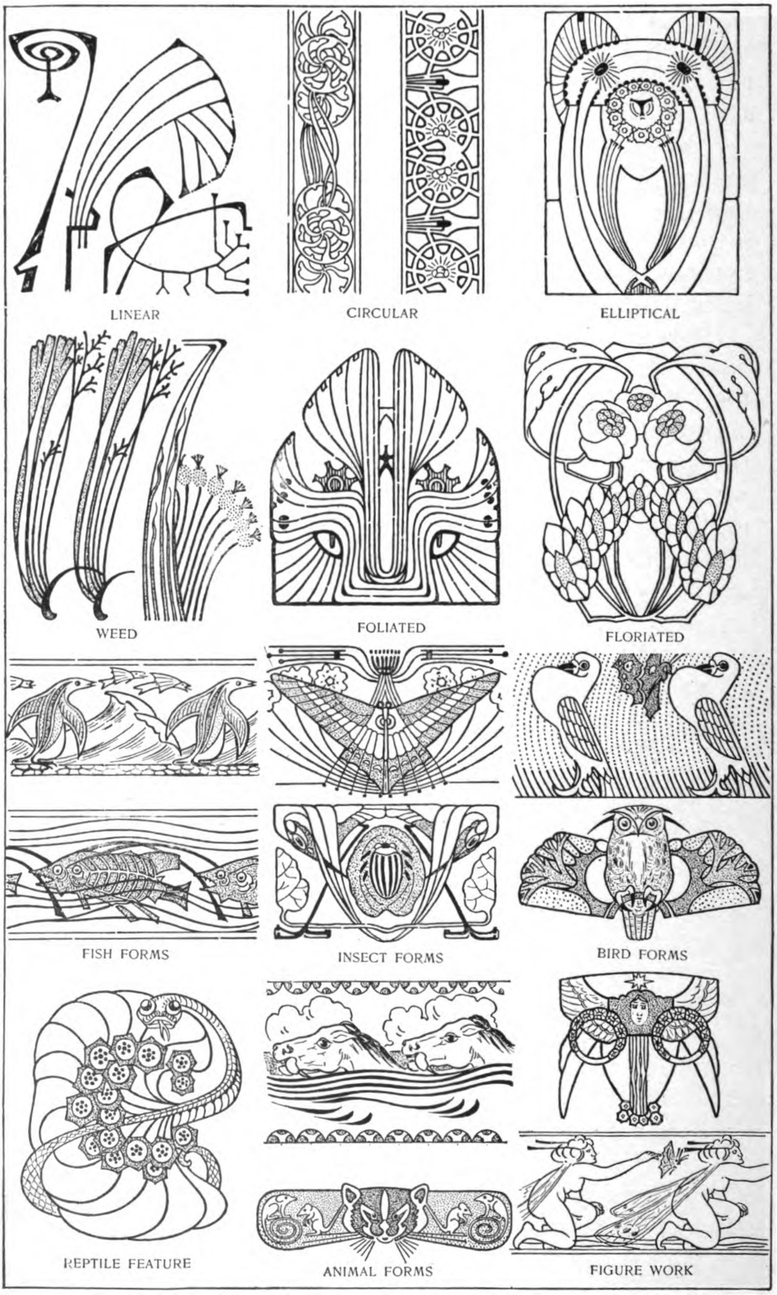
The use of battens against a wall of cartridge paper is shown in Fig. 80. The battens are 4 inches wide, and are placed so as to divide the wall into a pleasing variety of vertical and horizontal panels. The Dutch figures in the central horizontal panels are from a standard wallpaper pattern, and the sketches in the lower panels are rendered by hand. On each side of the fire opening is a low bench, and the chimney front is appropriately finished in Dutch tile. The chimney hood projects over the benches and is covered with small terra-cotta roofing tiles.

This idea of simplicity of line and form is carried out in the case of all accessories, such as lighting fixtures, hardware, furniture, etc., used in connection with interior decoration work of the Craftsman style.

69. L'Art Nouveau Style.—As its name implies, L'Art Nouveau is *the new art;* that is, a development along revolutionary lines, and was probably first apparent during the latter part of the 19th century in Austria and Germany, but later was practiced more or less in Great Britain, France, and America.

This style is supposed to be founded on natural growth, but much of it is either overrealistic or goes to the opposite extreme, where the motif of inspiration is beyond detection.

‘‘MODERN’’ DECORATION



LINEAR CIRCULAR ELLIPTICAL

WEED FOLIATED FLORIATED

FISH FORMS INSECT FORMS BIRD FORMS

REPTILE FEATURE ANIMAL FORMS FIGURE WORK

Fig. 81

However, the fact that it is based on the study and conventionalization of plants is conducive to the hope that a virile style may result.

A study of the work done by the Art Nouveau school shows that there is a tendency to long, sweeping lines that dominate the design as well as to a concentration of decorative motifs in strong contrast with plane surfaces. Whatever motifs are used, the idea of root, stem or trunk, and foliage seems to underlie the whole and to be the ruling idea, as is shown in Fig. 81.

In Fig. 82 is shown an American rendering of a design in L'Art Nouveau. This design is completely carried out, not only in the decorations and furniture, but also in the floor covering. The design is an interesting one from the harmony that exists throughout, and though not likely to find extended favor in practical American tastes, it possesses possibilities of development well worthy of study.

In Fig. 83 is shown a modern electric light fixture designed on Art Nouveau lines.

70. The Mission Style.—Strictly speaking, the Mission style is not a modern style, but its adaptation is modern. As in the case of the Craftsman style, the tendency of the Mission style is away from, rather than in favor of, excessive decoration. The Mission style is now principally identified with furniture and interior decorations of a certain type and is said to have been inspired by the work in the Franciscan Mission buildings of Southern California, although many modern buildings are now designed on lines much in sympathy with the old work. The Mission style is really a modern application of the Spanish Renaissance. In Fig. 84 is shown a collection of details of building construction, gables, panel work, etc., that are typical of the Mission style.

In Figs. 85 and 86 are shown electric light fixtures designed in the Mission style, which give an idea of the simple lines and correct mass and spacing that are typical of the dignity and simplicity of the Mission style.

71. The Secession Style.—The Secession style is not one of the modern styles in the United States, but is used for

“MISSION STYLE” DECORATION

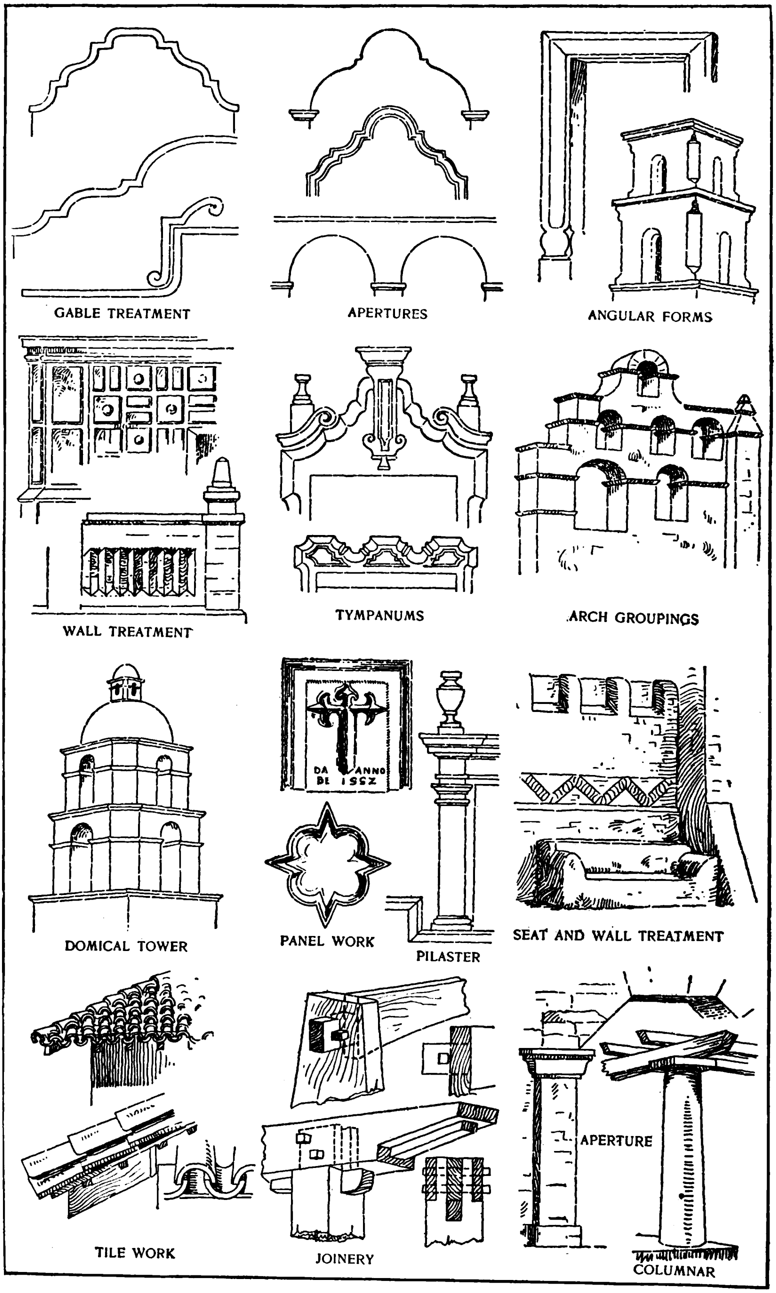

GABLE TREATMENT
APERTURES
ANGULAR FORMS
WALL TREATMENT
TYMPANUMS
ARCH GROUPINGS
DOMICAL TOWER
PANEL WORK
PILASTER
SEAT AND WALL TREATMENT
TILE WORK
JOINERY
APERTURE
COLUMNAR

FIG. 84

certain purposes in this country, and therefore needs to be considered. It might be termed an *Austrian Craftsman style*, because its underlying basis is that of simplicity and usefulness. The idea of the Austrian designers is to get away from the use of superficial decorative motifs; that is, anything that is merely pretty without there being any utilitarian need for it. Examples of interior decoration work in the Secession style are shown in Figs. 87 and 88, where the simplicity is very marked. The walls are hung with decorated burlap, and the woodwork is in a weathered-oak finish. The sinuous curves that characterize door openings, the hand rail across the glass, etc., conform exactly to the simplicity typical of the Secession style.

It is not the purpose in this connection to give detailed descriptions or examples of the decorative forms used by the Austrians and the Germans. The present consideration only concerns modern decorative work in the United States, such as would be used by the modern commercial designer.

72. **Modern Commercial Design Motifs.**—Just as it is impossible to refer to the architecture of present-day structures as modern architecture because most of the work shows the use of classic Roman and Greek, and Renaissance, details, so is it impossible to discover a definite standard style of design work that can be called modern. This is due to a variety of causes: present-day civilization is so complex, there are so many diverse forms of industrial products, old forms are abandoned and new fashions are devised in art work as in other fields, that it is practically impossible to standardize "modern" design work.

Only a decade or more ago the Art Nouveau, with its sinuous curves, overflowed every line of industrial art expression; it was seen in rugs, carpets, wallpapers, and even in the lines of the furniture. Soon the Art Nouveau gave way to the so-called Mission style, with its severe lines and underlying principle of utility, with a noticeable absence of decorative elements. But the Mission style itself lasted but a decade, or a little over, and a new style came into popularity, being influenced by the German and Austrian Secession style. This style, with its

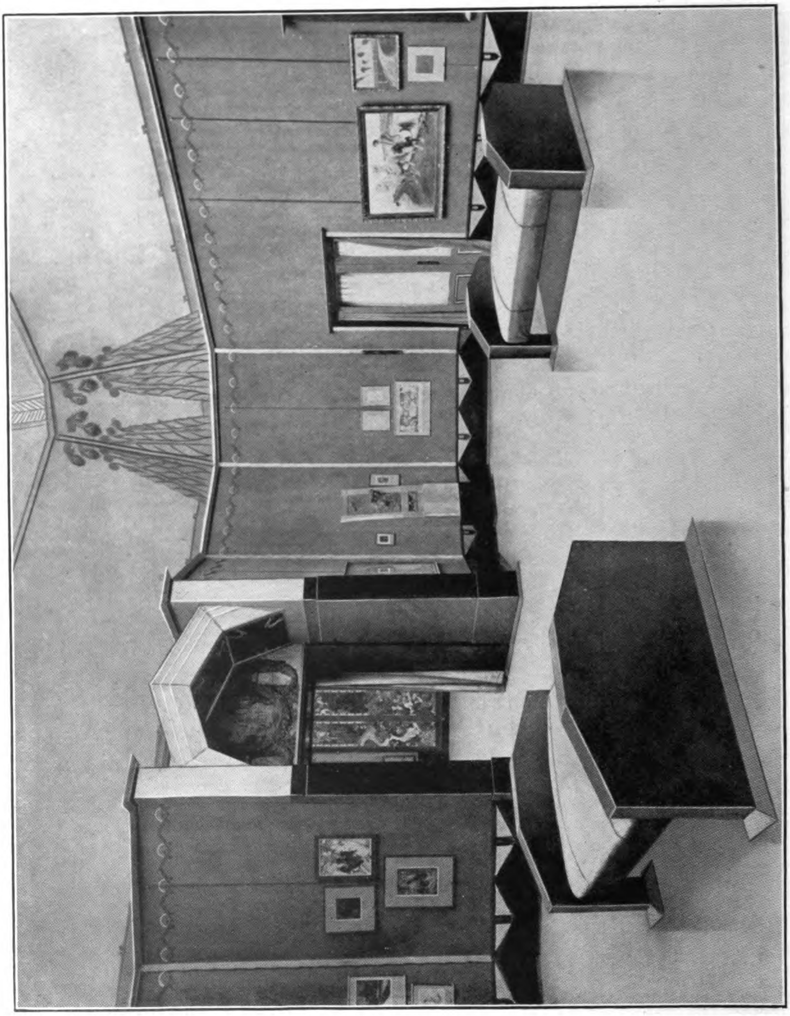


FIG. 87

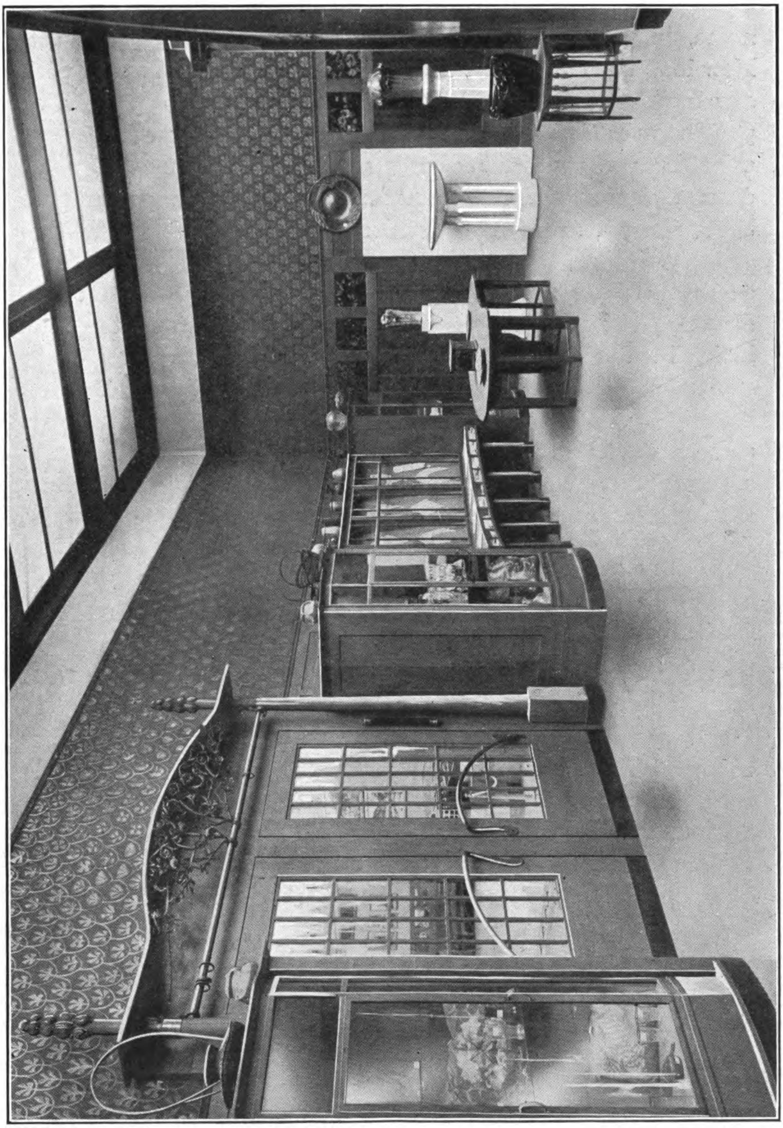


FIG. 88

German and Austrian motifs, has been given no particular name, but continues to influence commercial decorative art. How long the vogue for this style will exist cannot be said with any certainty. It may last a year or ten years. It may, as past experience has demonstrated, be altered or entirely set aside by political events, or wars, in foreign countries, the decorative styles of the countries that come into prominence being allowed to influence fashions in decorative styles in this country. Thus, after the Russian-Japanese war, Russian decorative embroidery, and even Russian fashions in dress, became the vogue in this country. Also, after the troubles, later, in the Balkan states, fashions in decorative work, draperies, dress, etc. in this country revealed a marked Balkan, Roumanian, and Turkish influence. As already stated, the present tendency in design work, interior decorations, etc. is along the lines of German, Austrian, and to some extent, Russian, motifs. How soon these tendencies may change can be determined only by political, historical, and geographical changes of the coming years.

In Fig. 89 are shown some of the German and Austrian design motifs on which the so-called "modern" commercial designs are based. A close inspection of their forms will reveal more than could be conveyed by verbal description. It is evident that the inspiration comes from conventionalized plant forms, but the forms are so severely conventionalized and are arranged in such an orderly manner that a very distinctive style results. Some of the decorative forms are based entirely on the decorative possibilities of orderly arranged brush strokes.

When this "modern" ornament is applied to wallpapers, carpets, rugs, etc., the decorative motifs are used in spots connected by long vertical lines, considerable blank field, or background, being allowed to show. When this style is used in painted interior decorations it takes the form of allowing considerable blank field space, which may or may not be in panels, the decorative features being confined to the narrow top frieze near the ceiling, or at the top of the panels. Sometimes a spot design of these modern motifs may be placed in the upper part of the panel.

"SECESSION STYLE" OF DECORATION

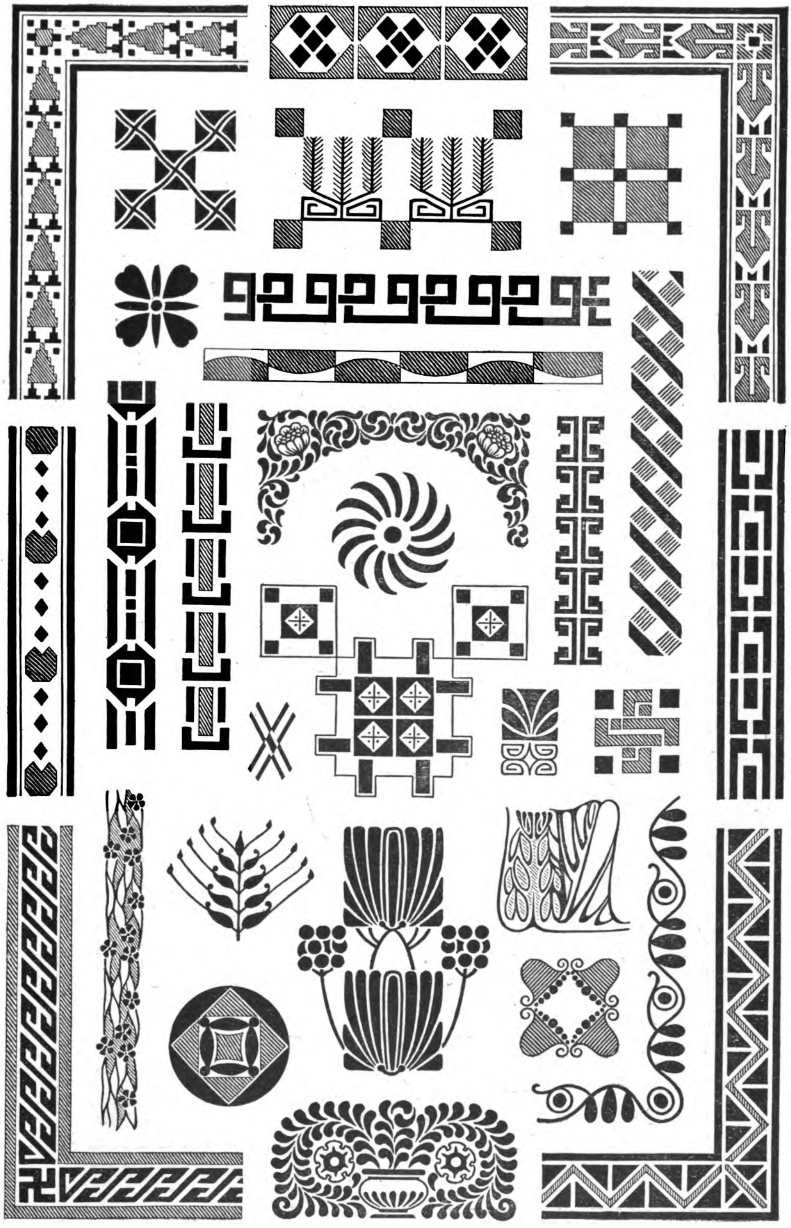


FIG. 89

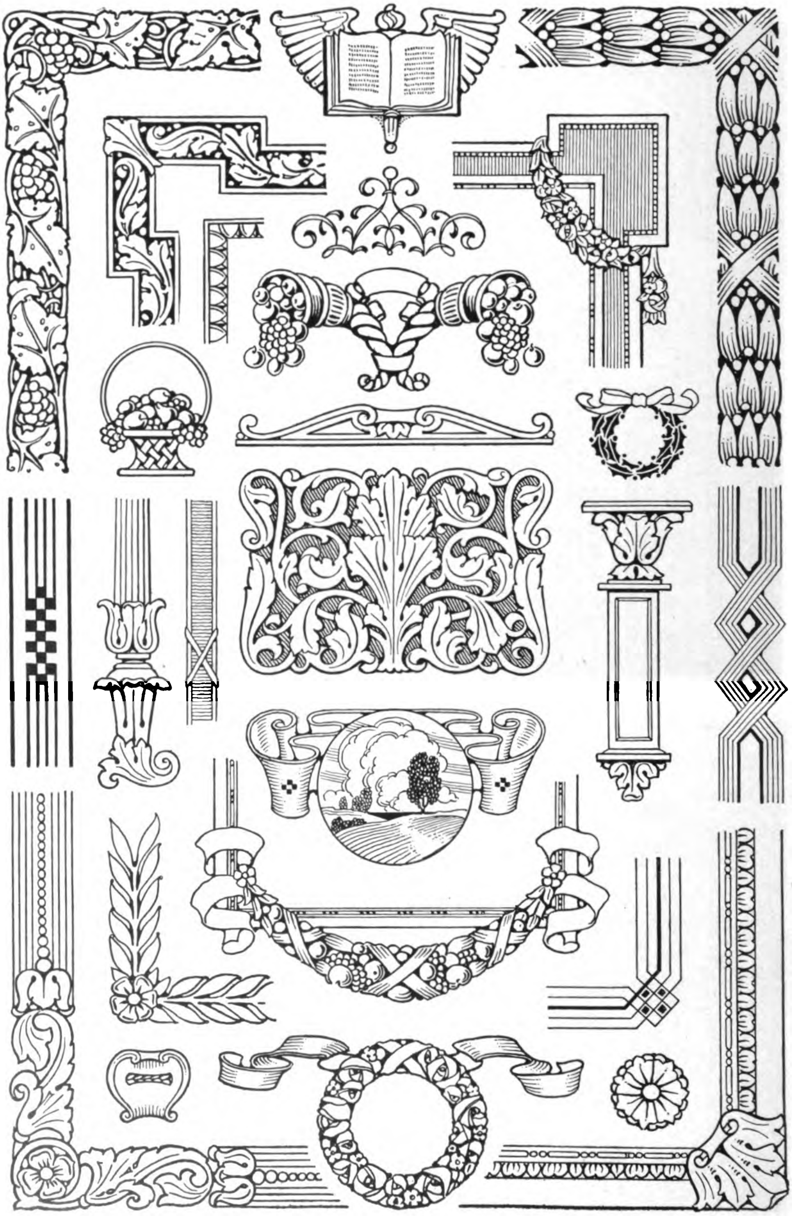


FIG. 90

There is considerable rivalry on the part of commercial artists, photoengravers, and advertisers to keep up to date and always get something new. Typographical designers and type-foundry companies are, from time to time, issuing new designs for type faces, and decorative head-pieces and tail-pieces, spot devices, and other decorative forms, to accompany these new type faces. These typographical designs influence to a great degree the decorative designs of the pen-and-ink commercial artist. In Fig. 90 is shown a collection of such modern commercial decorative motifs that, at the present time, are entirely up to date, and are such as are being used by modern commercial artists. They are well worth careful study, for the purpose of suggesting other similar devices that may be designed. Further, these devices themselves will serve, just as they stand, to be used in commercial design work of the class being described.

73. Method of Keeping in Touch With Designs of the Modern Style.—Inasmuch as there is no standardized modern style, and as the modern designs show varying tendencies, depending on the industrial line for which the designs are prepared, it will be necessary for the young designer to be on the alert to keep in touch with the latest forms of decorative design work in all these lines. He should visit interior-decoration shops, wallpaper and furniture stores, carpet and rug establishments, jewelry shops, department stores, etc., and look at their window displays, etc. Further, he should observe what is printed in advertisements and in current publications, to see what designs are being used, and should watch for the latest developments in every line of decorative work. This is the only method of keeping up to date.

DESIGNING EXERCISES

GENERAL INFORMATION

74. Required Work in This Section.—It has already been pointed out that the purpose of this Section is to make the student familiar with the decorative styles characteristic of various nations and peoples. Everything possible has been done to make these styles clear by means of description and illustrations. No student, however, can be sure that he has a working knowledge of these styles until he actually draws and paints them. The required work in this Section will therefore be the drawing and painting of certain characteristic historic styles of surface decoration, in accordance with the directions to be given below. These are not to be drawn for the purpose of applying them to commercial uses, but simply to show surface decoration within a given space, to be used for reference later. The work is to be in the form of drawing plates, as before.

75. Character of the Drawing Plates.—The drawing plates will be six in number, each one being 10 inches wide by 15 inches high, arranged vertically, and subdivided horizontally into two rectangles each 10 inches wide by 7½ inches high. The plates are to be sent to the Schools one by one for examination; and, while the first plate is being examined and returned, the student will be working on the following plate, this procedure being carried out throughout the entire subject.

Each one of the 10″×7½″ rectangles is to contain some characteristic example of decorative work belonging to the historic period specified. These examples are to be obtained from the illustrations in this Section. For instance, if an example of Egyptian decoration is called for as in the case of Exercise A of Plate 1, the student may select any of the examples shown in Figs. 3 to 12, inclusive; and similarly in the case of other styles specified for other rectangles. Any example that is selected must be drawn with the greatest care, and colored with the greatest fidelity to the original. This coloring must be done with water colors, in accordance with the system described in a previous Section. These examples of decorative work should in each case, unless otherwise specified, be made large enough to fill a rectangle 8 inches wide by 6 inches high.

PLATE 1

76. Exercise A, Plate 1.—In the upper 10″×7½″ rectangle, draw carefully, and paint in colors, an example, 8 inches by 6 inches, of Egyptian surface decoration.

77. Exercise B, Plate 1.—In the lower 10″×7½″ rectangle, draw carefully, and paint in colors, an example, 8 inches by 6 inches, of Greek surface decoration.

78. Final Work on Plate 1.—Letter or write the title, Plate 1: Historic Styles, at the top of the sheet, and on the back place class letters and number, name, address, and date of completing the plate. Roll the plate, place it in the mailing tube, and send to the Schools for examination. Then proceed with Plate 2.

PLATE 2

79. Exercise A, Plate 2.—In the upper 10″×7½″ rectangle, draw carefully, and paint in colors, an example, 8 inches by 6 inches, of Roman surface decoration.

80. Exercise B, Plate 2.—In the lower 10″×7½″ rectangle, draw carefully, and paint in colors, an example, 8 inches by 6 inches, of Byzantine surface decoration.

81. Final Work on Plate 2.—Letter or write the title, Plate 2: Historic Styles, at the top of the sheet, and on the back place class letters and number, name, address, and date of completing the plate. Roll the plate, place it in the mailing tube, and send to the Schools for examination. Then proceed with Plate 3.

PLATE 3

82. **Exercise A, Plate 3.**—In the upper 10″×7½″ rectangle, draw carefully, and paint in colors, an example, 8 inches by 6 inches, of Moorish interlacing surface decoration.

83. **Exercise B, Plate 3.**—In the lower 10″×7½″ rectangle, draw carefully, and paint in colors, an example, 8 inches by 6 inches, of Indian or Persian surface decoration.

84. **Final Work on Plate 3.**—Letter or write the title, Plate 3: Historic Styles, at the top of the sheet, and on the back place class letters and number, name and address, and date of completing the plate. Roll the plate, place it in the mailing tube, and send to the Schools for examination. Then proceed with Plate 4, if all required redrawn and rerendered work on the previous plates of this Section has been completed.

PLATE 4

85. **Exercise A, Plate 4.**—In the upper 10″×7½″ rectangle, draw carefully, and paint in colors, an example, 8 inches by 6 inches, of Gothic surface decoration.

86. **Exercise B, Plate 4.**—In the lower 10″×7½″ rectangle, draw carefully, and paint in colors, an example, 8 inches by 6 inches, of Renaissance surface decoration. This decoration may be either in one of the various styles of the French Renaissance or in the Italian Renaissance, the choice being left with the student.

87. **Final Work on Plate 4.**—Letter or write the title, Plate 4: Historic Styles, at the top of the sheet, and on the back place class letters and number, name and address, and date of completing the plate. Roll the plate, place it in the mailing tube, and send to the Schools for examination. Then proceed with Plate 5, if all required redrawn and rerendered work on the previous plates of this Section has been completed.

PLATE 5

88. **Exercise A, Plate 5.**—In the upper 10″×7½″ rectangle, draw carefully, and paint in colors if desired, an example, 8 inches by 6 inches, of English Renaissance decoration. The example may be Queen Anne, Jacobean, or Cromwellian, etc. This may be in simple black-and-white lines, if preferred.

89. **Exercise B, Plate 5.**—In the lower 10″×7½″ rectangle, draw carefully, and paint in colors if desired, an example, 8 inches by 6 inches, of so-called American Colonial decoration. This may be in simple black-and-white lines, if preferred.

90. **Final Work on Plate 5.**—Letter or write the title, Plate 5: Historic Styles, at the top of the sheet, and on the back place class letters and number, name and address, and date of completing the plate. Roll the plate, place it in the mailing tube, and send to the Schools for examination. Then proceed with Plate 5, if all required redrawn and rerendered work on the previous plates of this Section has been completed.

PLATE 6

91. **Exercise A, Plate 6.**—In the upper 10″×7½″ rectangle, draw carefully, and paint in colors, an example, 8 inches by 6 inches, of so-called Modern surface decoration. The *Art Nouveau* style is recommended.

92. **Exercise B, Plate 6.**—In the lower 10″×7½″ rectangle, draw carefully, and render in black-and-white, some specimens of modern commercial decoration such as would be suitable for pen-and-ink borders, headings, cover decorations, etc. Arrange the decorative motifs suitably to fill the 8″×6″ space within the large rectangle.

93. **Final Work on Plate 6.**—Letter or write the title, Plate 6: Historic Styles, at the top of the sheet, and on the back place class letters and number, name and address, and

date of completing the plate. Roll the plate, place in the mailing tube, and send to the Schools for examination.

If any redrawn work on any of the plates of this Section has been called for and has not yet been completed, it should be satisfactorily finished at this time. After all required work on the plates of this Section has been completed, the work of the next Section should be taken up at once.

INDEX

NOTE.—In this volume, each Section is complete in itself and has a number. This number is printed at the top of every page of the Section in the headline opposite the page number, and to distinguish the Section number from the page number, the Section number is preceded by a section mark (§). In order to find a reference, glance along the inside edges of the headlines until the desired Section number is found, then along the page numbers of that Section until the desired page is found. Thus, to find the reference "Acanthus, §12, p17," turn to the Section marked §12, then to page 17 of that Section.

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